What Counts Most in Product Purchase Decision?

By Bob Johnson
CW New York Bureau

Although DP product sales literature, vendor sales teams, research studies and advertisements pique the DP executives' interest, nothing influences the actual buying decision more than a testimonial from another DP manager already using the product.

That was the consensus from respondents to a recent *Computerworld* telephone survey designed to find out what methods the information processing professional uses to make his hardware and software purchasing decisions.

Ed Valliere, director of DP for Helene Curtiss Industries, Inc. in Chicago, said that his shop's method of doing purchase research involves the scrutiny of a number of sources, including studies by such organizations as Datapro Research Corp., but these are just "first cut" procedures.

"When we have finally narrowed down a list of products and the vendors we feel are most interesting, the real examination begins. We'll call on the vendor and ask for the particulars of its product, but more importantly, we will do a reference check on [the vendor] by finding users of [its] product," Valliere said.

The executive explained that many times a deal that looked very good initially was canceled after he visited and talked with another user and found out that the product's touted abilities and usefulness did not live up to vendor claims.

"I have gotten some real lowdowns from people in the real DP world. We uncover problems such as vendor lack of support and release data inconsistencies.

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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NEWSPAPER

Study Sees Few Problems Switching to Cobol-8X

By Lois Paul
CW Staff

GAITHERSBURG, Md. — Conversion from ANS-74 Cobol to the American National Standards Institute's proposed Cobol-8X standard will present few problems, according to a cost/benefit analysis of the revised language's impact on government agencies. In fact, the revised standard's effect will not be "dramatic, either for good or ill."

While the study — discussed at a seminar here last week by one of its authors — cites potential benefits in program development and maintenance that certain improved features of the language may yield, it said these changes "will hardly revolutionize Cobol programming in the federal sector."

The problems created by incompatibility between ANS-74 Cobol and Cobol-8X "are not unusual, either in kind or in degree," and the effect is "relatively small," the study added.

Started in February 1982, the study was conducted by interviewing government agency DP professionals and analyzing source code from 1,068 programs (1.37 mil-

(Continued on Page 6)

Integrated Data Base Link Ties Micros, Mainframes

By Paul Gillin
CW Staff

NEW YORK — In a move designed to provide an integrated data base link between mainframes and personal computers, Cullinet Software, Inc. pulled the wraps off three software products for IBM and IBM-compatible environments. Unveiled here last week were:

- A new version of Cullinet's IDMS that reportedly combines network and relational architectures in one system.
- A mainframe-based information data base that provides access to mainframe data for personal computer users.
- A data base-driven application software system for IBM Personal Computers (story on Page 8).

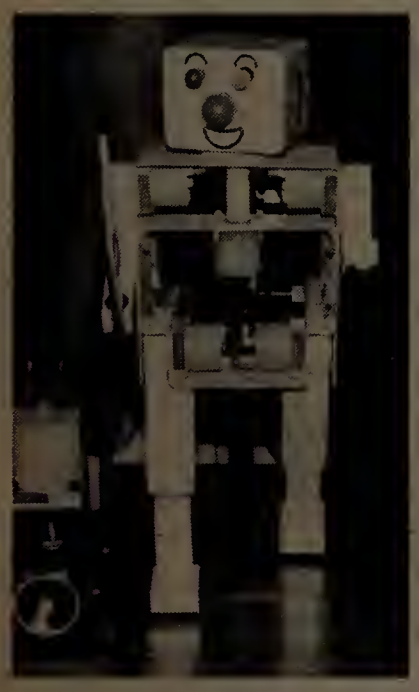
At the same time, Cullinet and Apple Computer, Inc. announced a joint development program to provide a connection between Apple's Lisa computer and data resident on IBM mainframes (story on Page 8).

Dubbed IDMS/Relational (IDMS/R), the new version of Cullinet's data base management system is said to combine the power of a network DBMS with the user-friendly features of the relational architecture on IBM mainframes. IDMS/R can be used interchangeably as a network DBMS for production applications or as a relational model for end users. All data can be directly accessed and utilized in either environment, according to a Cullinet spokesman.

IDMS/R allows end users to build applications by filling in the blanks in formatted displays built into the system. Relational data can be directly incorporated into production network models for building large applications. Conversely, production data can be accessed and manipulated from a relational point of view, the spokesman explained.

The product is fully compatible with IDMS as well as Cullinet's other data base

(Continued on Page 8)





CW Photos by B. Hoard

Robotics: The Vision and the Reality

A 20-year-old veteran of robotics that is still visionary (left) shared floor space with state-of-the-art robots at the 13th International Symposium on Industrial Robots/Robots 7 in Chicago last week. Coverage on Page 12 through Page 14.

SPECIAL**REPORT**

Inside — Computer-Based Manufacturing Systems: Making the Right Moves



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Industry Reps Pack Hearing to Protest Plan Limiting Software R&D Tax Credits

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Using terms like "betrayal," "discrimination" and "opportunistic revenue grabbing," electronics industry spokesmen gathered en masse here last week to protest an Internal Revenue Service proposal to limit sharply tax credits for software development.

The scene was an IRS hearing packed with several hundred tax attorneys and corporate lobbyists, who took strong and lengthy exception to the proposed regulation to deny the tax credit, included in the 1981 Economic Recovery Tax Act, for software research and development that is not aimed at demonstrably risky and novel products [CW, April 18].

The thrust of the arguments opposing the regulation was that it does not recognize the true nature of software R&D, is contrary to the intent of Congress when it passed the 1981 tax amendments and would cause serious economic and competitive harm to U.S. high-tech firms striving to stay ahead of foreign challengers.

Supporting electronics industry arguments was Rep. Ed Zschau (R-Calif.), newly elected representative from Silicon Valley, who addressed the hearing "from personal experience" gained as founder and chairman of System Industries, Inc., a Milpitas, Calif., producer of disk and tape storage systems.

"Software development was a major part of our business," Zschau said. Referring to the risk-taking R&D that built his firm, he contended the 1981 law's tax credit provision "was designed to create an environment that would further enhance this process."

He told the IRS officials that "given the technological trends . . . software is going to be an increasingly important component [of future systems], and if we exclude that from the R&D tax credit we will have made a major error in the implementation of the legislation."

Similar arguments were offered by attorneys representing IBM, the Association of Data Processing Service Organizations, Inc. (Adapso), the Computer and Business Equipment Manufacturers Association, the American Electronics Association and the Semiconductor Industry Association (SIA).

Manufacturing Main Line

IBM counsel John B. Jones said the IRS should not distinguish between hardware and software in approving R&D tax credits. "Software," he said, "doesn't belong on a separate track; it is the manufacturing main line of today." In light of Japan's "mammoth campaign" to surpass the U.S. in electronics technology, "it would be suicidal to put burdensome and gratuitous obstacles in the path of American software developers."

One of the more forceful appeals to the IRS was made by Lawrence J. Schoenberg, representing Adapso, who called the proposed regulation "discriminatory" and "opportunistic revenue grabbing" on the part of the government. "We do not appreciate . . . the coy sophistry of some of the [IRS] interpretations," he said, eliciting audience applause.

One of the government officials presiding over the hearing, George Mundstock, an attorney in the Treasury Department's Office of Tax Legislative Counsel, responded to Schoenberg by saying "sophistry or solipsism was not the goal" of the regulation's drafters. He said Congress meant the tax credit to be targeted at certain R&D activities and not to be an incentive for high-technology industries in general.

"Only true innovation" should qualify for the credit, he said, allowing "it is very, very difficult to draw the line . . . in these high-tech areas."

SIA spokesman Robert Perlman, however, argued that in the semiconductor industry "even major product improvements are routine and periodic," which evidently would be the IRS' reason for denying tax credits.

Perlman, director of taxes for Intel Corp., spoke of the "continuous, intensive race with foreign competitors, most of which are subsidized by their governments," adding "a firm's ability to develop and apply breakthrough technologies is crucial."

It was congressional appreciation of that competition that led to the 1981 provision, according to Perlman, who said the IRS proposal would "undercut Congress' supportive policies."

This Week

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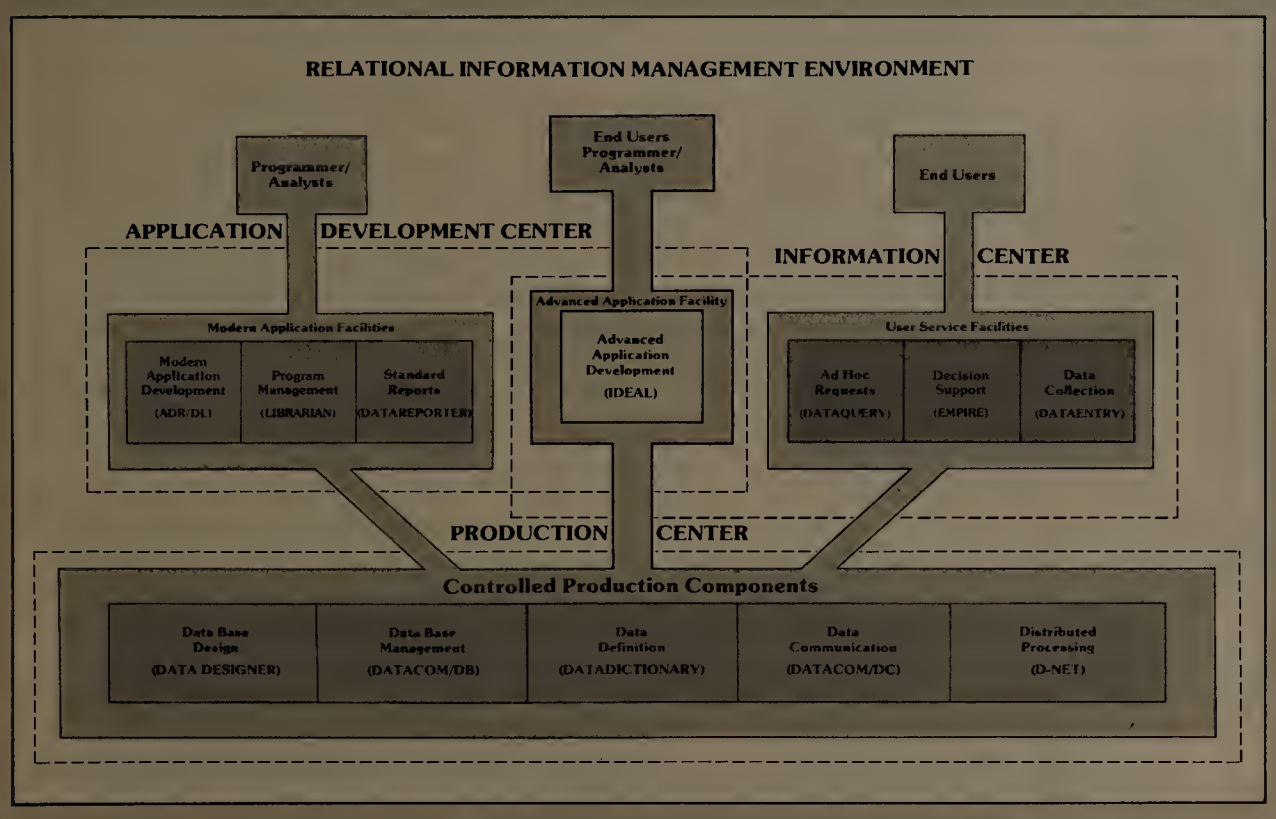
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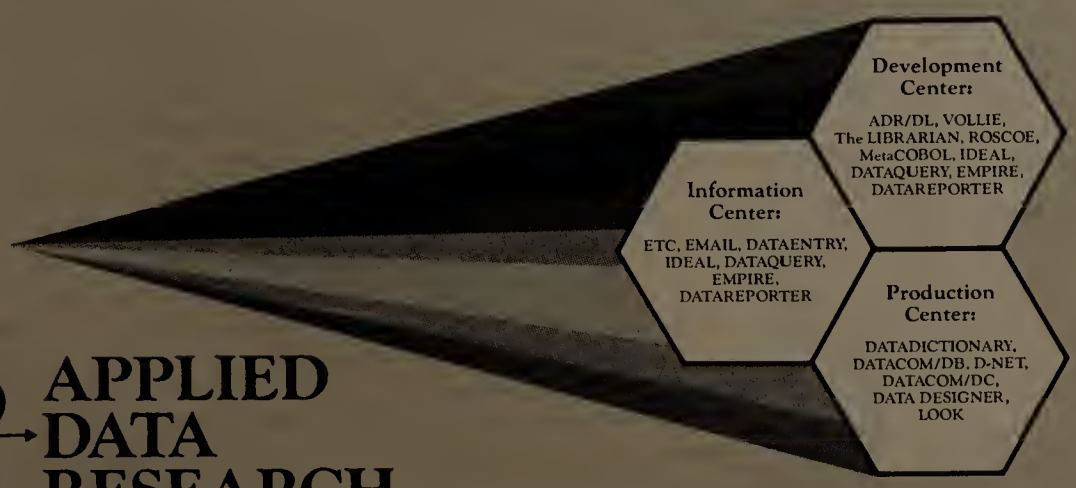
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Study Disputes 'High Tech Makes Jobs' Theory

By Susan Blakeney
CW Staff

STANFORD, Calif. — High technology will probably lower job skills and eliminate more jobs than it creates.

Those were the conclusions of two economists here at Stanford University's Institute for Research on Education Finance and Governance. Citing data provided by the Bureau of Labor Statistics and other sources, Prof. Henry Levin and Research Associate Russell Rumberger disputed the theory that high technology will upgrade job skills and provide more jobs than are presently available.

In a study entitled "The Educational Implications of High Technology," Levin and Rumberger said that while many high-tech occupations are enjoying rapid growth rates, they will account for only 7% of the new jobs created between 1978 and 1990.

Need for Janitors

Furthermore, "the U.S. will need three times as many new janitors and sextons (600,000) as new computer systems analysts (200,000) in this period." New openings for computer programmers will number 150,000, while new jobs for fast-food workers and kitchen helpers will total 800,000.

Officials in Minnesota's Governor's Office for Science and Technology, however, have taken issue with the Stanford report, contending "high-technology businesses will create the same array of challenging and menial jobs as we have had in the past."

Rumberger countered that claim and the brewing controversy over high tech's impact on jobs by saying, "They just don't want to believe it."

In addition, Rumberger maintained that opponents to the Stanford research "can't produce any evidence to the contrary," but added that "if [Stanford's research] generates debate, it's healthy."

Other Findings

The Stanford study also maintained that:

- Only three or four of the top 20 occupations in total number of new jobs require education beyond high school, and only two of those (teaching and nursing) require a college degree.
- Growth in professional and managerial jobs, projected at 28% over this period, will be far less than that of the preceding two decades (36% in the '60s, 45% in the '70s).
- The widespread use of computer-aided design may eliminate drafters in the future, a potential loss of 300,000 skilled positions.

Existing jobs will be "profoundly affected" by high technology, the study continued, which will likely "further simplify and routinize work tasks, reducing opportunities for worker individuality and judgment.

"Advances in software enable many workers to use computers without any knowledge of computer languages . . . Moreover, office computers perform many of the tasks formerly done by secretaries, actually reducing the requisite skills of office work."

While machines will be performing more complex tasks with the advancement of software, "the use of such sophisticated equipment will not necessarily require workers with more sophisticated skills. In fact, past technological advances suggest the opposite is often the case. The automobile of today [for example] is far more sophisticated than its predecessor of 50 years ago, yet today's car is far easier to drive."

Thus the Stanford study anticipates that entire classes of skilled workers will disappear or will be severely reduced in number as their jobs are replaced by robots or computer software.

Over the past 30 years, the study points out, technological advances in the printing industry have eliminated many complex craft jobs and reduced the skills required for those remaining in composing rooms.

Consequently, abrupt changes in work requirements may require better ties between education and industry and should not exclude the possibility of more industry-based training, the study advised. "Since workers may no longer acquire a set of job skills at the start of their careers useful over their entire work life, recurrent educational programs will be needed.

"The educational implications of high technology are that a solid basic education rather than narrow vocational preparation will become more important in the future," the report concludes.

Occupations	Employment (Thousands) 1978	1990	Percentage Increase	Number of Jobs (Thousands)
Fastest Relative Growth				
Data Processing Machine Mechanics	63	156	148	93
Paralegal	28	66	132	38
Computer Systems Analysts	185	384	108	199
Computer Operators	169	317	88	148
Office Machine and Cash Register Servicers	49	89	81	40
Total	494	1,012	105	518
Fastest Absolute Growth				
Janitors and Sextons	2,585	3,257	26	672
Nurses' Aids and Orderlies	1,089	1,683	55	594
Sales Clerks	2,771	3,362	21	591
Cashiers	1,501	2,046	36	545
Waiters/Waitresses	1,539	2,071	35	532
Total	9,485	12,419	31	2,934
Total, All Occupations	97,610	119,590	23	21,980

Source: Monthly Labor Review (August 1981)

Employment Growth in the Fastest Growing Occupations (1978-1990)

Union Chief Vows to Ease Job Changes

PHILADELPHIA — Workers' fears that computers may eliminate existing jobs rather than create new ones are not limited to the findings of America (CWA) here, union Presisity research report. At a recent meeting of the Communications Workers of America (CWA) here, union president Glenn Watts declared his determination to work with management to avoid the mistakes that now plague workers in the automobile and steel industries.

The 675,000-member union represents workers in public and private-sector communications jobs, including telephone operators, equipment makers and sound and electronic technicians. One of its current goals is to educate and ready its membership for the sweeping technological changes now under way in the industry.

While union officials admit that some union jobs will be lost forever to computers and that many workers will be dislocated, their aim is to ease the transition as much as possible and to minimize the dehumanizing "deskilling" of work and workers.

"What do you do with a hot lead cable splicer?" asked a union spokesman, referring to the move from coaxial cable to fiber-optic cable. "You can't put him on fiber-optic cable."

Like the findings of the Stanford study, the union indicated that today's and tomorrow's work force will be highly mobile and in a state of constant retraining as technology requires. It recommended replacing the old concept of "job security" with a new one called "employment security," with workers taking "portable skills" with them from one employer to another.

Research Reports Cover DP Planning

NEW YORK — "Management & Career Perspectives for MIS Executives" and "Long-Range & Strategic Planning for EDP" are two newly available research reports from Management International here.

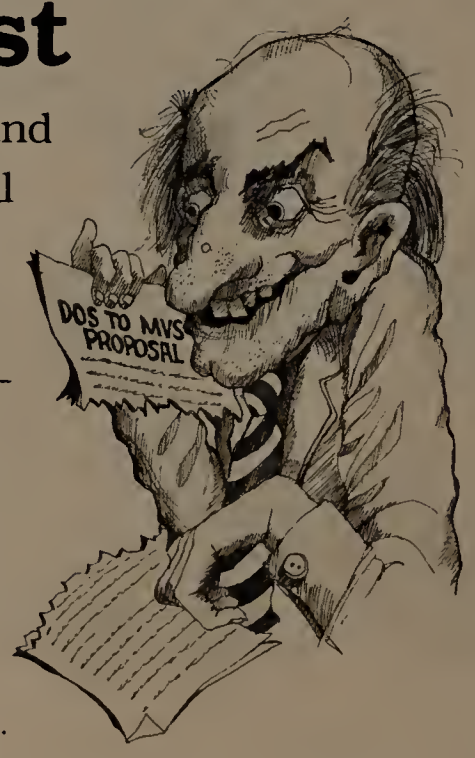
The first, comprised of survey data submitted by corporations, government agencies, universities and hospitals in the U.S. and Canada, includes an analytical overview to help MIS directors with planning, budgeting, personnel, salary administration and productivity problems.

"Long-Range & Strategic Planning for EDP" condenses surveys on long-range planning charters, policy manuals and timetables.

The reports cost $59.95 each. The firm can be reached through P.O. Box 1510, FDR Station, New York, N.Y. 10150.

mis·ō·nē′ ist

adj. [Gr. *miso-*, hating, and *neos*, new.] an individual possessing a hatred of innovation or change.



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COMPUTER ASSOCIATES

ADVANCED BUSINESS SOFTWARE

Consultant: Cobol-8X Benefits Worth the Cost

By Lois Paul
CW Staff

GAITHERSBURG, Md. — All of the fire and fury that the American National Standards Institute's (Ansi) proposed Cobol-8X standard has sparked in the DP industry remains a mystery to an Ansi X3J4 committee member who is convinced the changes to the language will prove more beneficial than costly.

"There is no [Ansi] standard that has received so much comment as this standard has received and is receiving," consultant Jerome Garfunkel told attendees at the opening session of a two-day symposium devoted to the proposed standard. The symposium was cosponsored by the National Bureau of Standards and the U.S. Office of Personnel Management.

Garfunkel then launched into a description of the proposed changes to the language and their expected benefits. He also offered some advice to DP managers about the changing nature of Cobol in general.

Although he is a member of several Cobol standards groups, Garfunkel said his overview of Cobol-8X was offered from his personal viewpoint and not as a committee viewpoint.

He took exception with some 1,700 of the 2,143 comments received about the proposed standard during the public review period that were basically form letters supplied by critics of Cobol-8X. "It is hard to distinguish the sincerity of the people who sent these letters from those who don't really know what they are doing," he said.

Changes to the language have been in five categories: structured programming, easing I/O processing, data manipulation, communications and general enhancements. In most cases, the Ansi committee's reason for each revision was to provide a clearer definition of a particular construction or to eliminate a user- or implementor-defined facility. Garfunkel stressed that the goal of the standards committee is to improve the portability of the Cobol language from one machine to another.

Speaker Addresses the Compatibility Issue

GAITHERSBURG, Md. — Fears that the American National Standards Institute's proposed Cobol-8X standard will cause compatibility problems were addressed at a presentation by consultant Jerome Garfunkel here last week.

Garfunkel described features added to the language such as the REPLACE verb, which is intended "to relieve the conversion problem of tripping over old words and for any general conversions." Acting like a text editor, this verb scans a source program, replacing the designated Cobol word with the specified new word.

Garfunkel also explained that many of the revisions included in Cobol-8X are intended to address the increasing importance of structured programming.

For example, the EVALUATE verb, which provides a means of testing multiple conditions and specifying multiple control branches, "allows us to take things from business specs of an application and insert them directly into a Cobol program." This differs markedly from the GO TO DEPENDING ON "n" clause in which "n" is represented by values that often are totally unrelated to the business problem the programmer is trying to solve.

The emphasis on structured constructs is a recognition that software engineering principles are working their way into every DP shop concerned with costs, he continued.

The changes that are being made to Cobol are making the language more "high level" and, at the same time, "more nitty-gritty like assembly language," Garfunkel said. This splitting of the language is fine, he said, so long as it is properly handled.



CW Photo by L.Paul

Jerome Garfunkel

However, he urged that the two modes should not be mixed in DP shops. "Rarely have I seen a place where you want applications programmers manipulating data at this sort of level," he said.

Study Sees Few Problems

(Continued from Page 1)

lion lines). Pointing to the $1.7 billion spent annually on Cobol programmers' salaries and to the approximately $3.2 billion Cobol software inventory in federal agencies, John Cugini of the National Bureau of Standards' (NBS) Institute for Computer Science and Technology stressed that "the stakes are very large."

Cugini coauthored the study, titled "Cost-Benefit Impact Study on the Adoption of the Draft Proposed Revised X3.23 American National Standard Programming Language Cobol," and discussed it here last week at a two-day seminar cosponsored by the NBS and the U.S. Office of Personnel Management.

Cugini co-authored the study, titled "Cost-Benefit Impact Study on the Adoption of the Draft Proposed Revised X3.23 American National Standard Programming Language Cobol," and discussed it here last week at a two-day seminar co-sponsored by the NBS and the U.S. Office of Personnel Management.

Among the benefits of Cobol-8X identified by the study are new features for modularization, structured code and string manipulation. Assuming those new features will bring a 5% improvement in program development and assuming they are adopted at the rate of 10% annually over 10 years, Cugini found this would save $36 million.

Looking at program maintenance, he assumed a 1% improvement from adoption of Cobol-8X. If this were adopted at 10% annually over 10 years, it would save $54 million.

The total savings, therefore, would be around $90 million, a figure that he said is "on the low side."

In assessing conversion costs, Cugini assumed there would be "no conversion for the sake of conversion." He concluded that the large numbers that have been "flung around" about conversion have been based on a virtual shutdown of DP production and a dedication to the conversion effort. For purposes of the study, he anticipated that most DP shops would introduce the modifications in an evolutionary process. Cugini said about 80% of the programs he examined would be affected by incompatibility with Cobol-8X.

However, this mainly referred to the programs including a DISPLAY verb, which has been implementer-defined until Cobol-8X and therefore varies on different machine versions of Cobol. Not counting the DISPLAY verb, about 40% of the programs examined would be affected. Approximately 25% would be affected by a nontrivial incompatibility.

Using a cost model developed by the General Services Administration's Federal Conversion Support Center, the researchers found the cost distribution of conversion to be around $18 million.

The study concluded that incompatibility is only a routine maintenance task.

Cugini said the research points to the need for Cobol standards education among federal DP users and managers. The study also found that source conversion is easy compared to data and job control language conversion.

The proposed Cobol standard was originally referred to as Cobol-80 because 1980 was the year slated for the standard's enactment. Ansi now refers to the proposed standard as Cobol-8X.

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Doors to NCC '83 Swing Open in Three Weeks

ANAHEIM, Calif. — The four-day event that marks the information processing industry's largest annual gathering will begin three weeks from today, when the doors to the National Computer Conference swing open to greet an expected 100,000 attendees.

NCC '83, whose theme is "The Emerging Information Age: Computers, Communications and People," will be held at the Anaheim Convention Center May 16-19. It will feature:

- An exhibit floor of 320,000 square feet on which 635 vendors will introduce new products and demonstrate existing ones.
- A technical program comprised of more than 80 sessions on software engineering; management/education; data base/distributed systems; human and social issues; office automation; decision support systems; hardware; telecommunications and applications; and personal computers.
- Twenty-two Professional Development Seminars, some lasting a half-day and others a full day, on topics that range from "Organizing the DP Manager's Time" to "End-User Facilities in the 1980s" to "Letting Go of Stress."
- A keynote address on "The Information Transformation — A Study in Survival" by John P. Imlay Jr., chairman of the board and chief executive officer of Management Science America, Inc.
- Pioneer Day, which will honor the achievements of Howard Hathaway Aiken and the Harvard Computation Laboratory.

How to Register

Information on how to register for NCC '83 is available from the show's sponsor, the American Federation of Information Processing Societies, Inc. (Afips), at 1815 N. Lynn St., Arlington Va. 22209. The full conference fee is $125, but those who register by Friday will receive a $25 discount.

The cost of spending one day only at NCC (program and exhibits) is $25. Those who wish to view only the exhibits on Monday through Friday will be charged a total of $35.

There is an additional charge for Professional Development Seminars, which cost $45 for the half-day sessions and $75 for the full-day sessions.

In an attempt to eliminate long registration lines, Afips this year is inaugurating early on-site registration. NCC participants can register on-site from May 7 to May 14 from 9 a.m. to 5 p.m. daily.

"Attendees from the Southern California area are encouraged to take the opportunity to avoid the large opening-day registration crowds and drive out to Anaheim the week prior to the conference and register," Afips said.

The organization also noted that the Anaheim Housing Bureau is presently accepting hotel reservations over the phone for the conference. Observing that "cancellations frequently occur in the month immediately preceding a conference," the organization said the "attendees who were previously unable to reserve rooms in the hotel of their choice may find that rooms are now available due to last-minute cancellations." The housing bureau can be reached at (714) 999-8939.

DIS Comments Asked

NEW YORK — The American National Standards Institute (Ansi) is seeking comments by June 18 on its Draft International Standard (DIS) No. 7929 on Magnetic Disk for Data Storage Devices.

This standard specifies the mechanical, physical and magnetic properties of a lubricated magnetic disk of 130mm outer diameter and 40mm inner diameter, intended for mounting in data storage devices.

Copies of the DIS may be obtained from Ansi's International Sales Department. Comments should be forwarded to Ansi's Director of Operations Daniel Smith, 1430 Broadway, New York, N.Y. 10018.

Career Job Fair Set Near NCC

ANAHEIM, Calif. — A technical career job fair will be held here May 16-17 at the Sheraton Hotel, a stone's throw from the National Computer Conference.

Sponsored by Business People, Inc. of Minneapolis, the two-day job fair will feature representatives from 40 major companies, including Apple Computer, Inc.; Boeing Corp.; Eastman Kodak Co.; GTE Sylvania Systems Group; IBM; Intel Corp.; ITT; McDonnell Douglas Automation Co.; Raytheon Co.; Texas Instruments Inc.; TRW Corp.; and Xerox Corp.

The fair will be conducted as an open house, with no registration fee or interview appointments required. Recruiters will conduct interviews and provide job seekers with information and literature on their company, according to a spokeswoman from Business People.

More information on the fair is available from Business People, 100 N. 7th St., Minneapolis, Minn. 55403.

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Cullinet Offers Micro-Mainframe Link

(Continued from Page 1)

tools, according to Cullinet President Robert N. Goldman. It will run on IBM 360, 370, 30 series, 4300 series and compatible processors in IBM OS and DOS operating environments.

Designed for an identical operating environment is Cullinet's Information Database. This software provides a buffer between the production data base and personal computers, offering central data processing control over corporate information while allowing users to access and manipulate corporate data, according to Donald F. Heitzman, Cullinet's director of System Software Development. The facility will interface directly with IDMS/R, IBM's IMS DBMS and other file organizations.

The Information Database consists of a series of files of summarized management information that may be created from either production data or external sources. The files reside on the mainframe and may be accessed from a personal computer using nonprocedural, menu-driven tools.

Files created on a personal computer can be stored in the Information Database and retrieved, broadcast or later used to update the production data base, a Cullinet spokesman claimed. Security parameters are defined at the mainframe level.

The software typically resides on the mainframe or on a separate system dedicated to Information Database operations. Networks can be built, with each Information Database remaining transparent to each other, Cullinet said.

The facility also provides a means to integrate personal computers into a network, offering capabilities to transmit documents or graphs via electronic mail.

A spokesman said test site installation of the new products will begin in December. IDMS/R is priced at $65,000 and the Information Database will cost $75,000.

Cullinet is based at 400 Blue Hill Drive, Westwood, Mass. 02090.

Cullinet Announcements Target IBM, Apple Personal Computers

NEW YORK — Both IBM and Apple Computer, Inc. were represented on the personal computer side of Cullinet Software, Inc.'s four-part announcement here last week.

The Cullinet Personal Computer System was introduced as an integrated set of management and decision support tools for IBM's Personal Computer. The software package reportedly offers spreadsheet, graphics, financial modeling, document processing and personal relational data base capabilities in a single package.

The Personal Computer System is fully integrated with Cullinet's Information Database and, since all of the microcomputer package software functions are built on a common architecture, they can interactively work together in the same environment, a spokesman said.

The spreadsheet software allows users to separate model relationships and data, making it possible to vary data and change relationships within the model, the spokesman continued. Financial modeling functions include trend analyses, revenue and expense analyses and reports, variance analyses and cash-flow projections.

Graphics capabilities include time series, bar charts, pie charts and line and symbol graphs. Both spreadsheet and graphics can be incorporated into system-generated documents, Cullinet said.

Document processing is a scaled-down word processing function designed for generating reports and correspondence, the company said.

Relational data base operations on the IBM Personal Computer can be used in conjunction with the spreadsheet and graphics functions to perform standard relational operations against files or other tables.

The IBM Personal Computer System will cost $1,000 per computer.

The Apple-Cullinet development effort is targeted at integrating Apple's Lisa computer with the Cullinet Information Database. Apple will work to optimize the Lisa architecture to interface with the Information Database.

On the marketing side, Cullinet will recommend Lisa as "an ideal executive office machine for readily accessing data from the Cullinet Information Database," the company said.

Corrections

Metropolitan Life Insurance Co. has never instituted a policy discouraging the in-house use of personal computers, despite a quote to the contrary in "Rejection of Micros Draws Astonishment" [CW, March 28]. The company is using personal computers extensively in its internal operations, as a story contained in that issue's Special Report indicated.

In the same story, a speaker at Future Computing, Inc.'s Fortune 1,000 Personal Computer Market Forum was quoted as saying in effect that E.F. Hutton's users are circumventing that company's ban on microcomputers and are ordering "hundreds" of the machines surreptitiously. Although no one has challenged the accuracy of the quote, the speaker was apparently misinformed about Hutton's situation. The orders that the speaker referred to number in the "dozens," not in the hundreds, and have the full approval of the firm's Central Systems Department, according to a spokesman.

In addition, the personal computers in question are earmarked exclusively for users in Hutton's insurance subsidiary, which is organizationally independent of the rest of the firm's business.

Endorsement Of Lisa Seen Coup for Apple

By Paul Gillin
CW Staff

Users may not be the only ones to benefit from Cullinet Software, Inc.'s announcement last week of an integrated data base link that reportedly allows microcomputers to access mainframe-based corporate data bases. At least one analyst said the big winner is Apple Computer, Inc., whose Lisa computer received Cullinet's endorsement as a major tool for accessing corporate information.

The two vendors announced a joint development program to provide a connection between Lisa and data resident on IBM mainframes.

Cullinet's claim that the newly introduced relational version of its IDMS data base management system can offer network power and relational features without significant performance degradation is an important announcement, according to Ulric Weil, an analyst for Morgan Stanley & Co. and author of *Information Systems in the '80s.*

"The memory requirements are very substantial for IDMS or [IBM's] IMS as well as for relational systems," Weil said. "If you had to run both, the problems are immense. Combining them into one system is very helpful."

'Highlight of Announcement'

Jan Kaplan, vice-president of research at Drexel Burnham Lambert, Inc., called the release of financial analysis and spreadsheet software for the IBM Personal Computer the highlight of the Cullinet announcement. "The Personal Computer software provides computing to the largest base of users and the largest base of machines, which is IBM," she said. Also significant, Kaplan noted, is the Information Database, a buffer between the corporate data base and end users that provides data manipulation and communications capabilities without disturbing production data.

"Over the next five years, we are going to see a proliferation of desktop devices and a transformation of who does programming," she said. "The critical element is just to make it easier to use the basic mainframe software without understanding the nuances of technical programming. Given Cullinet's experience, they are better positioned to provide this 'total' solution."

One analyst, who asked not to be identified, said any software that allows access to the corporate data base from microcomputers is going to need a technology like the Information Database. The analyst said McCormack and Dodge Corp.'s recent announcement of a micro-mainframe link [CW, April 18] included a similar technology that allowed sequential files to be summarized for processing on a micro.

Weil said the Apple-Cullinet agreement is a coup for Apple, which had been unable to make substantial inroads on the corporate market. "One reason for that is that Apple couldn't be tied into corporate data bases," Weil said. "Now that major hurdle is no longer a problem."

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Buying Decisions Surveyed

(Continued from Page 1)

You'd be surprised how often talking to another user will terminate a vendor's deal," Valliere maintained.

Another excellent aid in making procurement decisions, according to Valliere, are product symposia sponsored by independent companies. He said that at these symposia a number of vendor products for a particular application or piece of hardware will be analyzed by users. The sponsoring company sends questionnaires to users and then tallies the results, which are then made available to attendees.

"These symposia are a great help because the users contacted are not the users vendors will usually recommend. Sometimes a prospective buyer will be sent to a 'set-up site' where everything looks just fine. At the symposium, you know you're getting real information," the DP executive claimed.

Dan Martinez, senior vice-president of DP for the First National Bank of Florida, Tampa, Fla., also visits other user sites when evaluating products. Martinez noted that there is a big difference in making buying decisions between hardware and software in his installation.

"We are an IBM shop and use main-line IBM software, so when we look for hardware such as plug-compatible peripherals, we naturally look to IBM," he said.

When purchasing requires his operation to go outside of IBM, Martinez said that talking to other user shops is the method he follows to back up information from vendor sales teams.

He pointed out that because his IBM 3081 shop is not considered a large one, the DP staff does not "study things to death" when a purchasing situation arises. Depending on what is to be bought, the vice-president said that their procedures vary from case to case. "We don't try to reinvent the wheel. In some instances we do requirements studies using research reports, and in others we use good business sense based on experience."

Martinez stated that he preferred to "see things for himself." He noted, "We don't rely on research reports, and we're leery of surveys. Those things, and other tools such as newspaper and magazine advertisements, point out interesting products and applications, but they do not influence the final say in procurement. It boils down to our own personal best judgment."

Another IBM user, Donald Dentzer, director of management information systems (MIS) for CBS Entertainment in Los Angeles, said that they rely mostly on IBM market support. If the situation necessitates going outside of IBM they do not rely heavily on sales support and research material.

He said that because his is a remote site, most of the planning for adding equipment is done by an in-house team. "Corporate DP in New York does most of the procuring work. We're more concerned with performance. We don't want to experiment, so we need information on a product that reflects what it can actually do."

Contacts through professional associations and user groups also help the DPer make buying decisions, according to survey respondents. Joan B. Hoeberichts, vice-president of MIS for the Falcon Jet Corp. in Teterboro, N.J., said that in addition to using the traditional research and sales support aids, she belongs to a number of software and hardware user groups where she learns of products' capabilities and shortcomings.

Jerry Bultema, director of DP for the Kalamazoo Valley Intermediate School District in Michigan, also finds organized DP groups beneficial and finds associations particularly helpful.

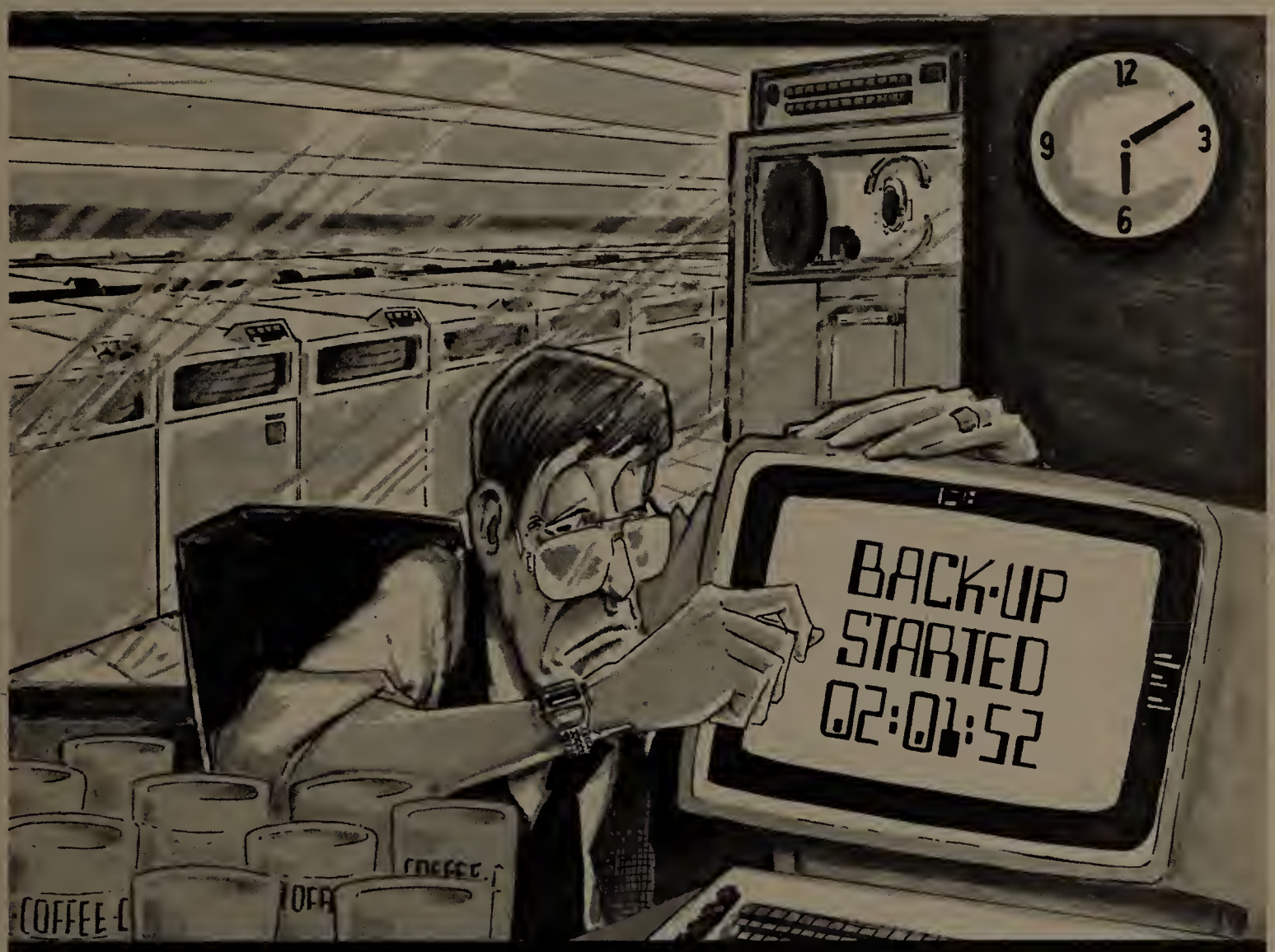
"I belong to the Association for Educational Data Systems, and I have discovered a number of valuable bits of information on products which I contemplated buying," he said. He added that the association allows him to meet other users with similar situations to his own and enables him to see their installed base.

Senate Agrees to Measure Delaying Tax Withholding Law

WASHINGTON, D.C. — Congress took a major step last week toward repealing the controversial new tax withholding law, a monumental and expensive reprogramming proposition for corporations and financial institutions.

The Senate leadership, the last major roadblock in Congress to repealing the law, agreed last Tuesday to a measure that would delay for four years the implementation date, currently set for this July 1, which would withhold 10% of interest and dividend payments. During that time, the government would further study the matter, a process that could easily lead to the eventual demise of the "withholding-at-the-source" proposal.

Although President Reagan has threatened to veto any legislation repealing or delaying the withholding regulation, the Senate action, coupled with overwhelming House of Representatives support for repealing the law, all but assures the antiwithholding forces enough votes to overcome Reagan's opposition.



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CW Survey Finds:

Micro Integration Mixed Bag for DP Managers

By Tom Henkel
CW Staff

Living with microcomputers in a DP shop can mean a life of trade-offs. What seems to be a benefit today may turn out to be a problem tomorrow.

However, according to the results of a survey of 10 DP managers conducted by *Computerworld* last week, those who have integrated micros into their DP operation agree on two things: Micro users are generally fast learners, and the microcomputer marketplace is changing very rapidly. Whether either situation is good or bad depends on your perspective, they said.

Among the managers polled, user enthusiasm is generally viewed as a good thing. The advantage is that nontechnical users who find the machines useful in their jobs are willing to learn how to use new functions as they become available. However, some DPers expressed concern that too much enthusiasm might loosen the DP department's control over the systems operation.

San Francisco-based Dolby Laboratories has had situations where more experienced employees have taught novice micro users "new" features of the firm's 29 Northstar Computers, Inc. micros.

While Bill Jasper, executive vice-president at Dolby, noted that this education is not all bad, it may educate employees to system features they are not supposed to know.

The booming microcomputer market is another area viewed in two ways by DP specialists. The obvious advantage is that more micro vendors means a broader selection for the management information systems executive planning to integrate micros into his DP operation. But that expanded choice can also be a problem, noted Tim Sagstetter, DP coordinator for Wasau Metals Co. in Wasau, Wis.

Sagstetter explained that more and more systems are being billed as compatible with popular microcomputers like IBM's Personal Computer. But not all of the so-called "compatible" processors have the same storage formats.

Therefore, a floppy disk drive recorded on one system may not work on another because the two machines have different recording densities. In a system configuration where users are expected to transport floppies from one system to another, the incompatibility of disk formats could be a problem, Sagstetter said.

Further Complications

The problem of choosing the right microcomputer is further complicated by working for a government agency, noted William H. Chambers, coordinator of information systems planning at Northern Virginia Community College in Annandale, Va. Chambers explained that since the college is state funded, it must request bids for microcomputer purchases — a process that can take upward of six months. In that time, Chambers noted, better systems may be announced or more users may want access to the system.

None of the executives polled told of severe problems involved in integrating micros into the DP operation. Most recounted technical problems with interfaces, software glitches and other snafus that threw stumbling blocks in the plan to integrate micros smoothly into the DP operation.

But most DP executives polled last week were generally satisfied with the way micros have been integrated into their DP operation. One user said he would have started planning for the process much earlier. And another urged DPers trying to integrate micros into the DP mainstream to move at a slow pace — avoiding a massive purchase of one type of micro.

The majority, however, said if they had it to do all over again, they would probably proceed in the same fashion.

Only one of the 10 information systems specialists polled, Northern Virginia's Chambers, has yet to successfully develop a micro-mainframe link. In Northern Virginia's situation, the college is trying to connect three IBM Personal Computers to its 4341 processor. Chambers said there have been problems with developing a workable communications link to the mainframe.

Software was a problem at the architectural firm of Rehler, Vaughn, Beaty and Koone, Inc. in San Antonio, Texas. Associate Vice-President Arthur Mazuca noted the firm has several software products it no longer uses because the company failed to consider whether it could buy the source code for the programs.

Finally, one DP manager with a relatively small company regretted he did not pay more attention when the president of his company decided to buy a microcomputer for home use. Now the firm's president is convinced his micro should be the company standard.

The DP manager disagreed, but "I should have helped him buy one that I wanted," he said.

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Information Center Concept Attracts DP Execs

By Bill Laberis
CW Staff

CAMBRIDGE, Mass. — Potential financial and operational risks notwithstanding, a sampling of attendees at last week's video conference on information centers indicated there is a growing interest in the interface between DP departments and end users.

The 50 attendees here were part of a nationwide teleconferencing audience of about 800 who gathered in 14 cities to hear James Martin's discourse on information centers. The satellite video conference was sponsored by Deltak, Inc.

The conference followed by one week the release of a report by International Data Corp. warning of the pitfalls of information centers, including resistance from mainstream DP departments, which fear a dilution of their personnel and responsibilities [CW, April 11].

"We haven't experienced any resistance to date," said Raymond Badowski, senior information center consultant at Southern New England Telephone Co., when asked about the reaction of the data processing department there to the information center concept.

Southern New England Telephone is in the process of establishing an information center using some personnel from its information systems organization, Badowski said.

The information center will be up and running by the third quarter of this year, according to Badowski.

The center grew out of a recognition that the traditional DP department arrangement "was getting too fragmented," Badowski said.

"With the proliferation of computer applications and uses in recent years, our users were getting very confused as to where to go with their problems. One of our functions will be to direct them to the right office and right person," Badowski went on to say.

'Visible Organization'

According to Badowski, the information center will "be a very visible organization," addressing issues such as the increasing use and value of personal computers within Southern New England Telephone and effective use of the company's data bases.

"Users are getting more comfortable doing things themselves," Badowski said.

"We'll do our own teaching to show them how to get what they want. We're not simply going to hand out IBM manuals and say 'Go to it.' "

However, center personnel will be extra careful not to overstep their bounds, he cautioned. "If the applications group [in the data processing department] says it will take six months to generate an application, we won't turn around and tell a user he can have it in a day or two," according to Badowski.

Wayne Bond, computer operations manager at Uniroyal, Inc. in Middlebury, Conn., said several people in his company are mulling the information center concept, but no definitive implementation plans have hatched.

Bond said he likes the center concept, but believes "some people can go overboard in formality . . . this exact number of people on the staff, this type of equipment . . . this is overkill."

Bond said his shop probably could provide the staff for the information center but, he added, the cost of doing so would be difficult to justify, especially with the prevailing economic conditions.

Dennis Gutman of the First National Bank of Boston said he "just wanted to listen to Martin . . . to see how his idea of what the center is compares to ours."

First National is considering establishing an information center at its DP headquarters in nearby Dorchester, Mass., "because we realize we have X number of managers, and only Z amount of those have access to data. It seems the twain will never meet the way things are done now," according to Gutman.

Gutman said he believes an information center can better acquaint executive management with computerized systems, as management will feel more comfortable knowing there is a centralized DP routing center for end users.

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Too Many Companies Fill Demand

Analyst Predicts 'Shakeout' in Robotics Industry

By Bruce Hoard
CW Staff

CHICAGO — "There's going to be a shakeout," Laura Conigliaro of Prudential-Bache Securities, Inc. predicted of the robotics industry here last week.

Speaking at the 13th International Symposium on Industrial Robots/Robots 7, the Prudential-Bache vice-president and industry analyst noted, "We now have too many companies in the industry." She said there are between 50 and 100 U.S. vendors, 200 to 300 Japanese vendors and "several dozen" in Europe.

Conigliaro predicted a group of about 15 manufacturers will break away from their competitors and assume leadership positions. She segmented that group into three divisions: established companies, large companies just entering the robotics market and start-up companies backed by venture capital.

CW at Robots 7

She named six companies in the established category: Unimation, Inc. (recently acquired by Westinghouse Electric Corp.); Cincinnati Milicron; Prab Robots, Inc.; Asea, Inc.; Devilbiss Co.; and Copperweld Robotics, Inc.

In 1979, those six "were the industry," and as late as 1981, they constituted 94% of the industry, she maintained. However, the proliferation of microprocessors made it possible for new competitors to close the technology parity gap.

"The microprocessor — like it or not — has found its way to the factory floor in the form of many kinds of equipment, including robots," she commented.

The six established vendors gave up 25% of their market share to new companies in 1982, and that figure will rise to 47% during 1983, Conigliaro declared.

Users are also changing, she added. They are reevaluating their return on investment theories and considering the broader implications of manufacturing technology.

The established vendors enjoy the advantage of large installed bases but the disadvantage of being targeted by the new competition. According to Conigliaro, they have become "universities." "They're great places to go if you're looking for robot people," she stated.

The industry analyst claimed U.S. venture capital firms have invested $50 million into start-up robotics companies.

These originally well-financed companies have money, but lack name recognition and have very little margin for error in so competitive a market, she declared.

Typical Start-Up Firm

Conigliaro said the typical start-up firm targets a 10% market share for itself. She portrayed the folly of such thinking by explaining she had read over 50 business plans from start-up companies in the past 1½ years. Those firms carved out a market share five times larger than what actually existed, she said.

"Giant" companies such as GM Fanuc and United Technologies Corp. appear to have unlimited financial backing, but in reality, financial backing for robotics divisions of large companies is "very, very transient," she claimed.

Commenting on competing Japanese vendors, she said, "In part, we seem to be conceding the industry to them." She departed from that philosophy by pointing out that the Japanese companies are relatively weak in the area of support — an area where American users demand excellence.

Turning to industry revenue figures, Conigliaro referred to 1982 as a "tough, tough year" that none the less generated $190 million in industry revenues, a 23% increase over 1981. "That's not bad for a pretty terrible year in the economy," the vice-president noted.

She predicted 1983 will see modest gains and said 1984 will be "the first real breakout year in capital spending since the recession began."

The start-up companies jumped from a 2% market share in 1980 to 14% in 1983 and could well garner a 20% share or more during 1984, she said. The new large entries had comparable figures of 5% in 1982, 18% in 1983 and 20% or more in 1984. "That's almost a natural evolution of the market," she stated.

She described the mood before last year's Robots/6 conference and exhibition in Detroit as euphoric. By contrast, the mood this year is "much more grounded in hard realism," she noted.

Conigliaro found a silver lining in the recessionary cloud that has suppressed the U.S. economy. It has given robot vendors the opportunity to be better prepared to offer practical solutions.

"And users would be smart to take advantage of that," Conigliaro said.

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Robot Need Seen Threat to Blue-Collar Worker

CW at Robots 7

By Bruce Hoard
CW Staff

CHICAGO — There may be a recession in the capital goods industry, but attendees at the U.S.' largest robot show last week still perceived a strong demand for the extensive array of iron arms surrounding them.

The show was the 13th International Symposium on Industrial Robots/Robots 7, and the attitudes were surprisingly upbeat in these hard economic times. According to most of the 12 attendees interviewed on the exhibition floor, not only is there a demand for robots, there is a need for them if the U.S. is to keep pace with its international industrial competitors.

The surprisingly uniform sample of attendees also largely agreed that while robots may pose a threat to U.S. blue-collar workers, they are the wave of the future. Given that scenario, they expressed concern for potentially displaced workers and suggested they accept the inevitable by retraining themselves for the future.

Asked about the demand for robots, Geoffrey L. Howland, development engineer with McNeil Consumer Products in Fort Washington, Pa., said, "I think there's a very good demand, but as the companies implement, there will be shortfalls. As soon as they [robots] are paid for, they [companies] will be looking for the new ones to replace them."

He stressed the necessity of carefully integrating robots with people. "We've got to do it, but we have to do it right," Howland observed.

"I imagine by 1990, it will be a $2 billion industry," said Thomas A. McNamara, president of Management Search International in St. Louis. "We have to compete with foreign competition, otherwise we'll be left behind." On the question of robots as a possible threat to blue-collar workers, he noted, "I think people will have to retrain and learn new things or they'll be left behind, too."

'High Demand'

Mark A. Schultz, sales manager with Eck Industries, Manitowoc, Wis., felt there was "a pretty high demand" for industrial robots. He cited the need to compete with Japanese auto manufacturers and added that the widespread use of robotics "will upgrade the technical ability of people. Instead of putting in rivets, they'll be learning how to make robots."

Don Wilkinson claimed that 25% of big U.S. industrial companies are currently considering robot purchases. The senior manufacturing engineer with Bendix Hydraulic Division said, "I think robots are important because they reduce costs. You're putting the part out more efficiently than you would with a person." He also acknowledged the robotics threat to blue-collar workers.

At least one attendee decried the emphasis on robot size at the show. Frank R. Fagoel thought too many were too big. Said the senior equipment engineer with Abbott Laboratories in Laurinburg, N.C., "Ninety-five percent of the market handles stuff under two pounds."

Despite that reservation, he agreed there is a national need for robots. "We'll never be successful if we don't compete in the world marketplace. The American worker has lost all pride in his work."

"I think the demand is very high, primarily because of the need to reduce costs, the need to find a better way," replied Joseph F. Barnes, manager of engineering with Lufkin in Apex, N.C. How important are robots to the U.S. economy? "On a scale of one to 10, I'd put it at about 10," he declared.

Not everybody hopped on the robot bandwagon. Michael Baird, senior scientist with Fairchild Camera and Instrument Corp. in Palo Alto, Calif., resisted.

"The robotics concept is probably pretty oversold," he commented.

Blue-collar workers need not worry about robots, according to him. "Automation is a boon for hourly labor, not a threat, and robotics is no different," he maintained.

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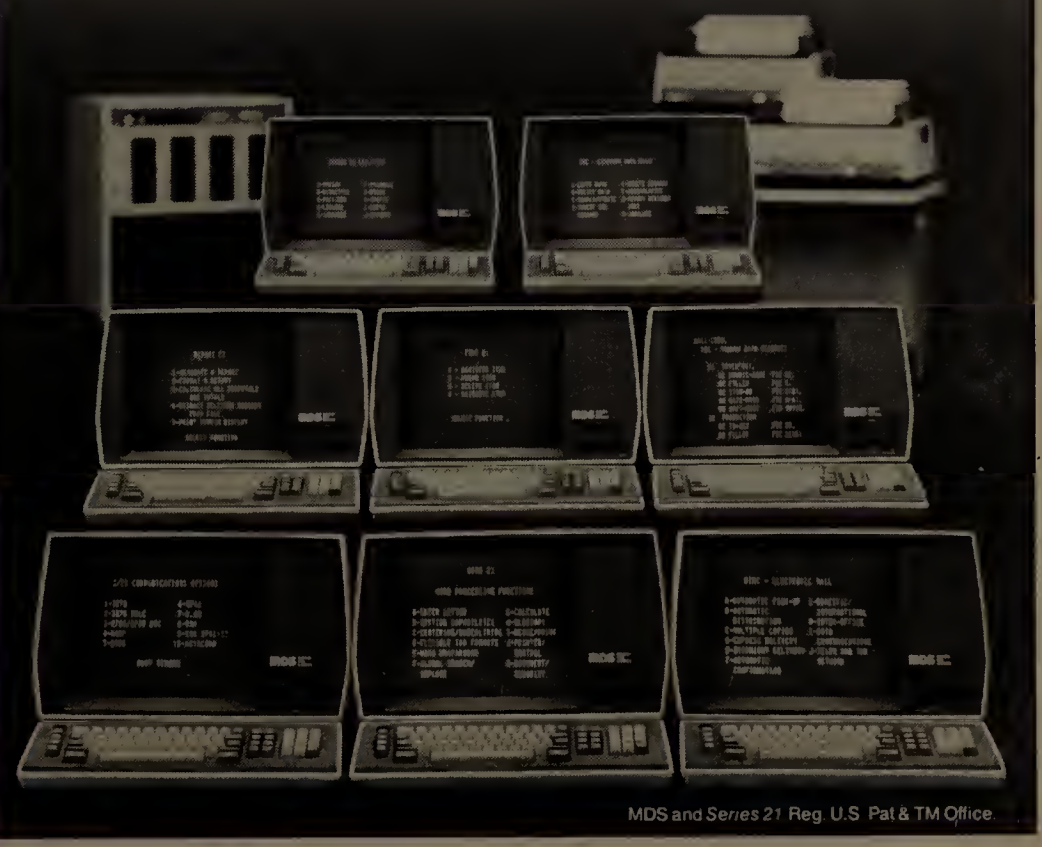
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Semi Production One Possibility

Robot Arm for Precision Projects Under Way

By Bruce Hoard
CW Staff

KAWASAKI, Japan — In an age when robots are making robots, the Fujitsu Robotics Laboratory and its director Kuro Kawa are developing a robot capable of making silicon semiconductors.

After three years of work, the Microarm 150 robot arm — which has six degrees of freedom — has the ability to move and return to a spot as little as four microns away from where it started. That makes it a candidate for such precise work as the assembly of electronic parts, optical devices and semiconductors.

Kawa, however, does not see the Microarm 150 and other robots of its ilk being used in the kind of mass production processes employed in semiconductor manufacturing. Instead, he predicted its future lies in the production of specialty items like optical lasers.

"You don't need 100,000 units. You need 10, 20 or 30, then you can use it," he commented, adding that its ability to be reprogrammed on a day-by-day basis gives it the kind of flexibility needed in custom production runs.

Asked whether the U.S. or Japan is more advanced in the development of robotics technology, Kawa said the U.S. is the technological leader. "As far as research is concerned, I think the U.S. is far advanced," he declared. "But in usage, Japan is probably a little ahead."

Japanese workers think of robots as their friends while their U.S. counterparts are threatened by the devices. In Japan, he explained, people cooperate with robots and vice versa.

"One thing I feel is quite different here from the U.S. is that the average educational background of the Japanese worker is higher, so Japanese people don't want repetitious jobs U.S. workers will take," Kawa commented.

In addition to the Microarm 150, Kawa's Fujitsu Lab is working on a "variable compliance element" that enables a robot to place a bar into a hole designed to accommodate it. It has passed out of the lab into the hands of product planners within the company. "We hope in the near future to be able to assemble magnetic disks," he noted.

He also outlined a project currently being carried out by Japan's Ministry for International Trade and Industry (Miti) that is working toward the development of "a robot for critical work." The critical work will be performed in dangerous areas of plants and mines. Such a robot would be dissimilar to the "dumb" robots currently used in automobile production and spray painting applications, he said.

Instead, it would be able to "see," "hear" and have some autonomous movement. Kawa hopes to receive some Miti money for work on the project.

The director believes the slowness of robots is one of their most critical shortcomings. "We have to increase the speed in every respect," he said. "Recognition takes up computer time and the arm motion is still very slow." He also said more work should be done on robot systems as opposed to stand-alone robots.

Good robotics software and software writers are hard to come by, he noted, adding, "It's very difficult if you want good software." A true robot must be programmable and computer-controlled, he maintained.

Although he did not have figures indicating the numbers of robots made in Japan each year, Kawa estimated that $500 million was poured into the industry last year.

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DPer Demand Seen Steadying

NEW YORK — The demand for DP professionals may be stabilizing, according to an employment survey conducted by Deutsch, Shea and Evans, Inc. here.

Of the 275 high-ranking executives in Fortune 1000 firms questioned, 52% responded they will maintain their DP staffs at current levels in 1983, 30% said they intend to recruit and 12% will lay people off.

This is a noticeable softening of demand from a year ago when 34% were increasing and 7% were decreasing DP staffs, a spokeswoman for Deutsch, Shea and Evans said.

As to whether things will change in the second half of 1983, 47% do not think so and 31% do not know. Those who do foresee a change expect a 9% increase in employment for DP professionals.

Nearly one-third of the responding companies said they need an assortment of computer and DP professionals that range from programmers to computer software architects.

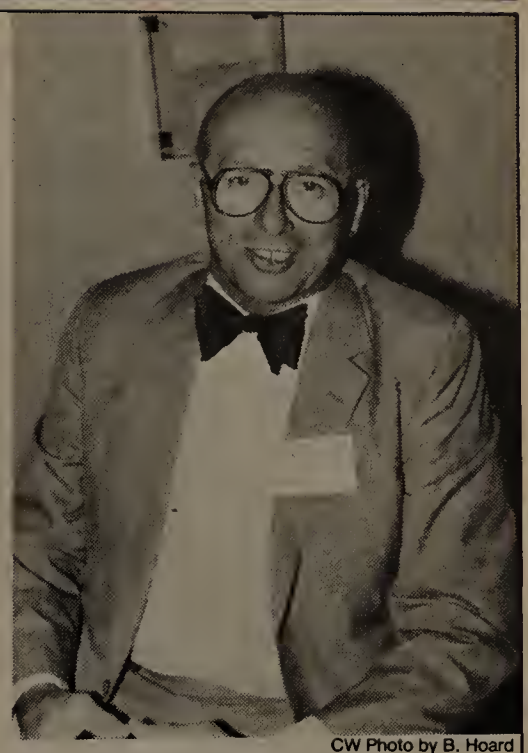
The typical responding firm was an industrial or manufacturing organization with under 10,000 employees and with one or more facilities in the Midwest.

A Nuts-and-Bolts Interview With 'Father' of Robotics

Joseph F. Engleberger, also known as the father of robotics, first took an interest in robots when he was a physics student at Columbia University. At that time, Isaac Asimov was writing his "I, Robot" stories and the young Engleberger became entranced by the science fiction aspects.

With the founding of Unimation, Inc. in 1962, he jumped feetfirst into the nonfiction realm of robotics. Since then his company — recently acquired by Westinghouse Electric Corp. — has been the single most successful firm of its kind, with more than 7,500 robots installed worldwide.

When Computerworld *Senior Editor Bruce Hoard caught up with him at the recent 13th International Symposium on Industrial Robots/Robots 7 Conference and Exposition in Chicago, Engleberger had just returned from his 18th journey to Japan.*



CW Photo by B. Hoard

Joseph F. Engleberger

CW: Is the evolution of robotics technology flattening out at this point?

Engleberger: No, I'd just say we've come up against some hard points. There's going to be more done in the line of dynamics; we'll be able to get the machines to work faster. We'll do a better job with vision, a better job with tactile sensing, a better job with voice communications.

CW: Which areas are developing fastest and slowest right now?

Engleberger: I think there's more being accomplished in vision today than any other thing. There's certainly less in tactile sensing. There's not very much being done in mobility. Voice communications is really quite good because it's a much bigger game than robotics.

CW: How are robots being integrated in computer-aided design and manufacturing (CAD/CAM) systems right now? Is that happening a lot?

Engleberger: Very little. There are several people working on it. We've worked with Computervision [Corp.]. If you take CAD/CAM, 92% of CAD/CAM is CAD. And the robot really fits more into the CAM part of it, the making part of it, and that's still struggling to get organized.

CW: Despite the fact that we may be ahead in technology, no matter how you define the term robot, it seems Japan has more in use than we do. Why is that?

Engleberger: The Japanese are superb implementers. If something exists, they can look at it quite practically and make use of it. There's a lot of cultural things helping them also. While lifetime employment is really not nearly as ubiquitous as people think, it is what happens at the major companies. So there's no concern about job loss. The Japanese are a monolithic society . . . they have a constant population. Their demographic studies say they will always have a labor shortage, so they feel they have to automate or they will not be able to maintain their market positions.

CW: How quickly is American industry moving toward widespread use of robots?

Engleberger: Well, I believe that on average, the industry is growing at the rate of 35% annually. But this is a plateau year, and the reason is that all capital goods are at a plateau. All capital goods are highly depressed right now. That plateau is distasteful, but not deadly.

CW: Is it difficult to get good software for robots?

Engleberger: It's hard to get good software. We're very jealous of our own and protect it very carefully. We don't give anyone source code even though people scream and yell, but we won't let anyone have it. They'll have the application knowledge but we never tell them how to work in code.

CW: What will robots be doing 20 years from now?

Engleberger: This August we'll be doing neurosurgery. We'll certainly be able to handle all kinds of fast-food preparation. So the service industries will become important. And I really believe that before 20 years are up, you will see an honest-to-God, useful, worthwhile, highly desirable household servant. It will be able to do simple cooking, all the cleaning, maintenance of your appliances — furnaces, air conditioning — home security, of course. I really think all the bits and pieces will be available by 1990.



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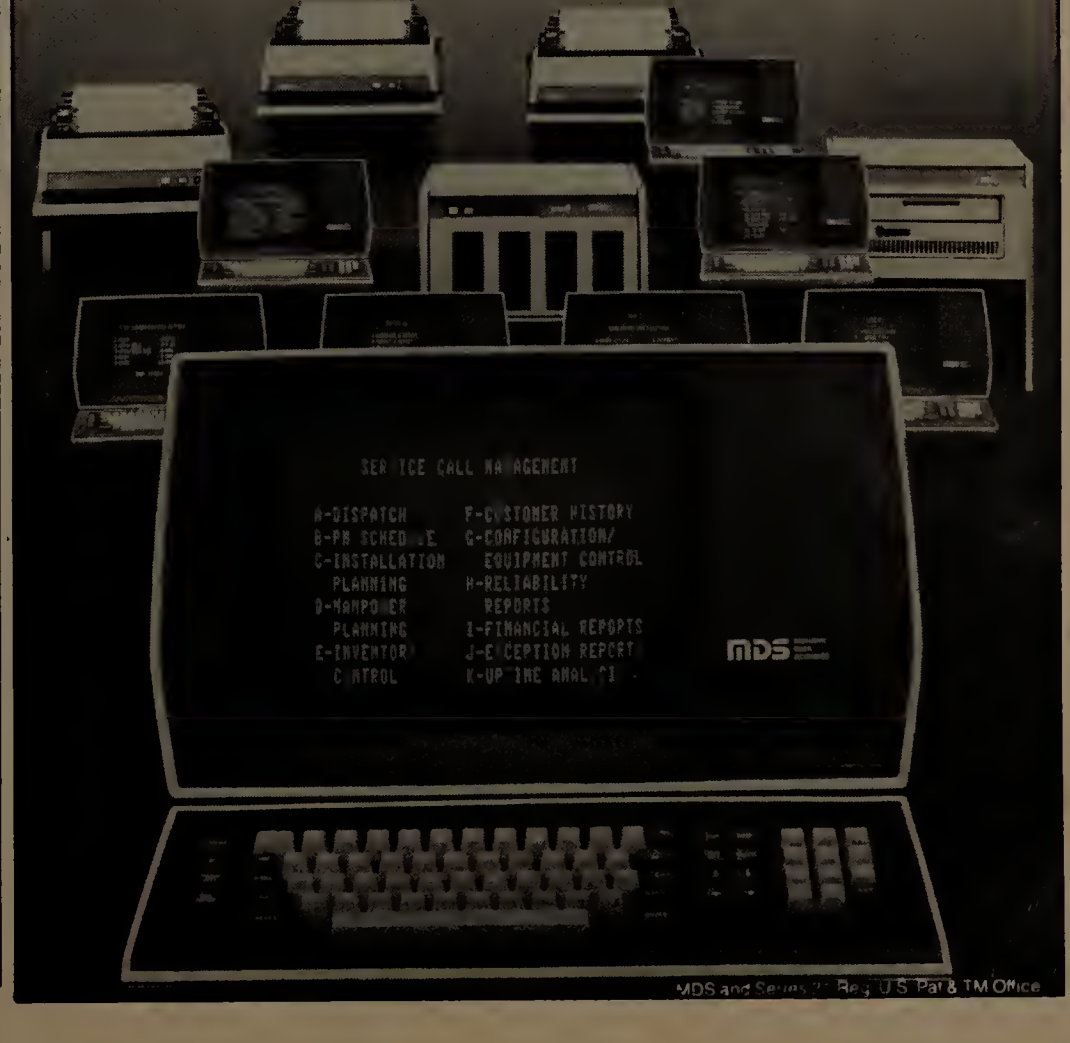
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Advanced Tech Proposed as Weapon

Legislation Under Study to Bag Welfare Cheats

By Jeffry Beeler
CW West Coast Bureau

SACRAMENTO, Calif. — State legislators here will begin this week to debate a proposed law that would give California authorities improved technology for spotting illegal recipients of government aid.

If passed, Assembly Bill A.B. 861 would result in the creation of a statewide "assets clearance system" that would uncover suspected welfare cheats by matching income tax records against a list of California residents on the public dole.

The bill would also pave the way for a second fraud-detection system that would give food stamp issuers on-line access to their authorization files and thus prevent potential cheaters from obtaining duplicate stamps in different counties.

Both the food stamp authorization and assets clearance systems were first proposed in A.B. 448, which was later merged with A.B. 861.

Introduced about three months ago by state Assemblyman Ernest Konnyu (R.-Saratoga), A.B. 861 is scheduled to receive its first legislative airing on April 26 at the Human Services Committee of the California Assembly.

If it wins approval there, the bill will then have to survive the Assembly Ways and Means Committee, the full Assembly floor, two Senate committees and the full Senate floor before it could be signed into law.

At each step along the legislative way, the proposed law will face scrutiny and possible revisions and may even be flatly rejected before it ever reaches Gov. George Deukmejian's desk for final consideration.

Although it already enjoys strong support among Konnyu's Republican colleagues, A.B. 861 still probably faces a tough legislative fight ahead, the assemblyman said.

If it eventually finds its way into the state statute books, the bill will expand and perpetuate an assets clearance system that has already gone into pilot operation in four California counties — Alameda, Los Angeles, Santa Barbara and Shasta.

Two Sets of Data

In essence, the system starts with two sets of raw data — an electronically stored list of California welfare recipients and taxpayer records as collected by the Franchise Tax Board, the state equivalent of the Internal Revenue Service.

The system then searches the taxpayer files for the names of any California residents whose interest income as reported on their latest tax returns indicates an average bank balance of more than $1,500. Under the state law, Californians whose account balances exceed $1,500 are ineligible to receive state welfare.

At the same time, the system also compares the findings from its first search to the names on California's master list of state welfare recipients. If the system finds any matches between the two sets of data, government authorities may have good reason to suspect some form of welfare fraud, Konnyu said.

At present, the test involving the assets clearance system is limited to just the four counties and is set to expire on June 30, which marks the end of California's current fiscal year. But if A.B. 861 becomes law, the system would be expanded to cover the entire state and would continue to operate indefinitely, Konnyu said.

Automation of Activities

The enactment of A.B. 861 would also lead to the automation of all data entry and collection activities at the state's various food stamp issuance centers. Under the proposed upgrade, the names of all applicants for state-issued food stamps would be entered into remote processors through on-site CRT terminals.

From the CPUs out in the field, the names and other pertinent application information would then be forwarded to a host mainframe in the state's Health and Social Services Department here.

By storing all such input centrally, the system would allow government workers in remote offices to tell almost instantaneously whether a food stamp applicant in one county has already received aid in another. The system would, therefore, greatly accelerate the detection of possible food stamp frauds that otherwise might go unnoticed for as long as several months, Konnyu said.

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SATISFACTION GUARANTEED

Spearheaded by New Breed of End Users, CEO

Exec Predicts Changes in Role of DP Department

By Jim Bartimo
CW Staff

TARPON SPRINGS, Fla. — The combination of a new breed of more technically sophisticated end users and a more concerned chief executive officer (CEO) will soon change the role of the data processing department, according to Michael Hammer, president of the Cambridge, Mass., consulting firm, Hammer and Co.

Hammer made this statement during a keynote presentation on "The Changing Role of DP" at International Data Corp.'s (IDC) 14th Spring Executive Conference here last week. A major factor in the change in both users' and senior management's attitudes toward data processing stems from the advent of the personal computer. "The personal computer represents immediate gratification for the backlog of applications out there," Hammer said.

In addition, "a lot of CEOs are saying, 'DP is 10% of my budget and will soon be 15%; I want to know what's going on,' " Hammer said.

What's going on is that the DP department is going to change from the central repository of information to one part of a larger information structure. Personal computers, word processors and decision support systems will service the needs of the individual; a departmental system will service the needs of small groups; and today's DP department will become tomorrow's corporate umbrella under which these many systems will fit, Hammer said.

As this structure is imposed, DP will have to reevaluate its identity and become more marketing-oriented and aggressive. "Data processing [personnel] will become consultants and the center of making things work," Hammer said.

The types of skills needed in the new DP department will be technical, business, political and people skills. But Hammer warned that finding DP professionals with these skills in the '80s will be as difficult as it was to find qualified programmers in the 1950s.



Michael Hammer

CW Photo by P. Keefe

Increased Tech Responsibility

But not all the responsibility will fall on DP. Along with increased technical knowledge will come increased technical responsibility for the end-user departments. "The user manager will become more involved and committed," Hammer said of application implementations. "We must require them to be more educated than they have been."

User departments will have to stop saying "Oh no, they're going to automate my department" and start taking a entrepreneurial approach to automation — thinking of hardware as an investment that will pay dividends in the long run, Hammer said.

With the user departments sharing responsibility for systems implementation, the DP department will become more involved in the management and planning of a distributed environment, Hammer said.

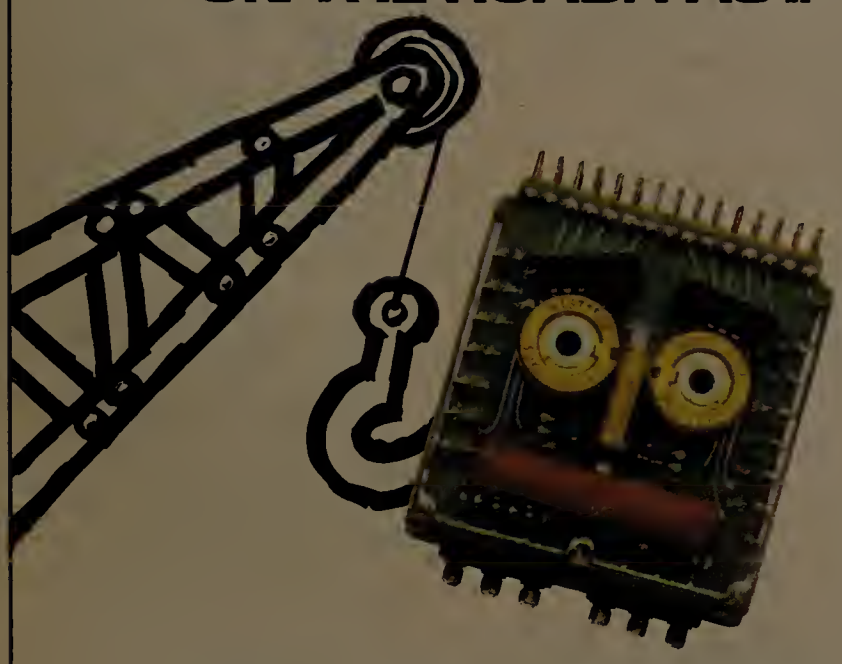
NIMR to Sponsor Meet July 18-20

WASHINGTON, D.C. — "Financial Information Systems: The New Generation" is the subject of a three-day conference slated to take place here July 18-20.

The conference, sponsored by the National Institute for Management Research (NIMR), will focus on the application of new computer hardware, software, communications technology and management techniques in integrating financial information and management systems successfully.

Registration for this event is $595. Further details are available from the NIMR at P.O. Box 3727, Santa Monica, Calif. 90403.

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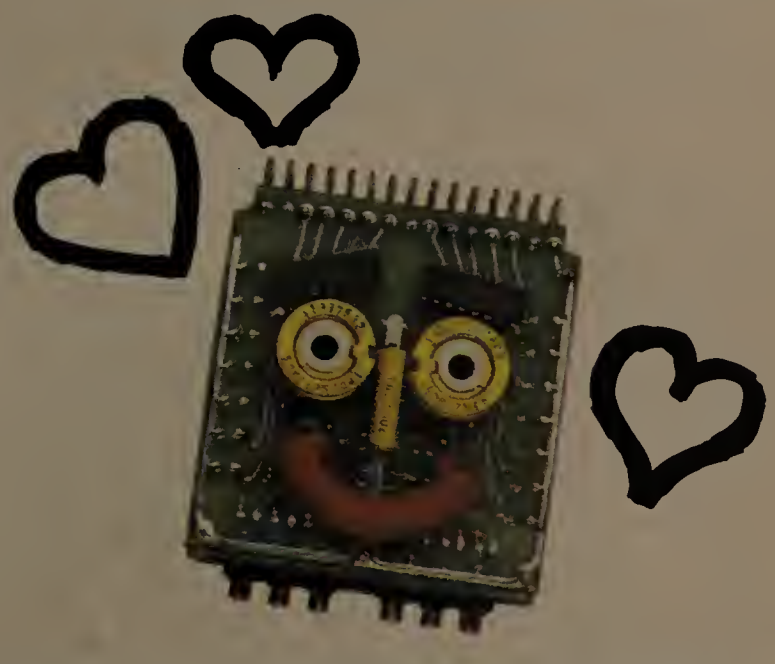
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OA Boom Seen Forcing Change in MIS Focus

By Patricia Keefe
CW Staff

TARPON SPRINGS, Fla. — The coming boom in office automation will force the management information systems (MIS) organization of the '80s to focus on issues such as better management of data and expansion of traditional data access methods.

Key strategies in addressing those issues will be the information center and user/MIS committees, according to panelists from three DP shops who spoke here addressing "OA/MIS Integration Issues," at International Data Corp.'s conference on "Office Systems for the '80s: Integration and the Bottom Line."

The panelists were F. Richard Lennon, director of MIS at United Technologies, Essex Group; Donna J. Cooper, manager of Model Offices Project at Liberty Mutual Insurance Co.; and Kavin Moody, director of systems planning and research for corporate MIS at the Gillete Co.

Bypassing MIS

In the office of the future, as envisioned by the panel, knowledgeable users will create their own business applications, bypassing MIS while accessing the corporate data base on desktop micros.

MIS, in turn, will be trying to integrate office automation into an overall information management scheme — no easy task, according to Lennon.

"We recognize that more effective management of our information resources and new methods of organizing and operating our offices are essential to our future," he said. And traditional approaches, those of large-scale computers and system development activities, form a solid foundation but are not a total solution, Lennon added.

A new attitude is emerging about information resources, panelists agreed, which states that while MIS is responsible for the maintenance and security of data, the data itself belongs to the end users.

Information centers were cited by all three panelists as a place where end users could be trained to meet their own information processing requirements in a nontechnical, nonthreatening and unstructured environment — the antithesis of the traditional view of DP.

Faster Turnaround

And faster turnaround of user-initiated requests for information processing-type support allows MIS to concentrate on other projects, such as local-area networking and data cataloging.

User-led committees are used to help to set priorities and guide OA strategies at Gillete and Liberty Mutual.

Further, under the Essex Group Information Center approach, to boost computer literacy, senior executives are painlessly introduced to the capabilities of OA via an Executive Personal Computer Program.

After attending three-day workshops, the executives are given an IBM Personal Computer to take home and "get comfortable with." Within three to six months, Lennon expects to see those workstations "migrating" back to the office as executives begin to realize their potential uses.

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Exposium '83 Set for May 3

MILWAUKEE — Exposium '83, the 11th annual office automation conference and exhibit sponsored by the Word Processing Society, Inc. (WPSI), will be held here May 3-5.

The 36 seminars scheduled for this event will cover word processing, information processing, data processing and office automation issues. Among those on hand to address conference goers will be Harold Pluimer, a Minneapolis-based futurist and consultant.

Admission to this conference costs $385. Further details are available from WPSI at Suite 101, 9401 W. Beloit Road, Milwaukee, Wis. 53227.

Fla. DP Law Credited With Switch to Guilty Plea

By Jim Bartimo
CW Staff

MIAMI — Confronted with about 20 potential expert witnesses, a local woman last month pleaded guilty to charges of defrauding her employer, a Connecticut insurance company, of $206,000 through the use of a remote terminal.

Diane Smith Torres changed her plea from innocent to guilty in Dade County Circuit Court when faced with charges based on Florida's computer crime law and two additional counts of grand theft and insurance fraud. Torres could be sentenced in May to 35 years in prison for her computerized method of submitting false insurance claims to the Connecticut General Insurance Co.'s six IBM 3081s from the Dade County field claims office.

Torres used her position as benefits analyst to submit insurance claims under false names and the names of personnel at Martin Marietta Corp., a customer of Connecticut General, according to assistant state attorney in Dade County's Insurance Fraud Department, Jim Falco. Between April 1981 and January 1983, she had 42 separate checks sent to herself, her father and her boyfriend.

Despite the multiple name falsifications, the repetition of the same addresses eventually tipped off Connecticut General and the Internal Security Department of its parent company, Cigna Corp., according to Tom Treiber, assistant director of internal security at Cigna.

"We then conducted a field investigation [in Florida] and found [the] bank confirmed she had deposited about the same amount of money," he said.

Fred Robbins, Torres' attorney from Weiner, Robbins, Tunkey and Ross, said, "It was her first offense and she's attempted to make restitution to the company, so I'd like to think the court will treat her leniently."

Florida's Law

But Florida's computer crime law — which was the first in the nation to become law and is a model for many other states [CW, March 28] — may make leniency harder to persue, according to Falco. "She faced $206,000 in restitution and $25,000 in fines," Falco said. "The state gave me a choice of computer crime law [provisions] that would impose five or 15 years in prison and I went for the 15 years."

The pressure placed on Torres to change her plea is partly credited by Falco to the existence of the Florida law. Torres' guilty plea marks the second conviction under Florida's computer crime law, which was enacted in 1978 by Bill Nelson, former state representative.

Nelson (D-Fla.), now in the U.S. Congress, is attempting to push through a similar law on the federal level. "This prosecution is very good experience," Nelson said. "I will try to bring Falco up to Washington. He will provide substantive testimony to Congress in passing a federal law to prohibit this new type of crime," he added.

Many state computer crime laws are eschewed by prosecutors because the laws are untested, and this may create problems in court. "This precedent will lead to more prosecutions," Treiber said. "I think Florida's statute is good because it carries a 15-year penalty and is very broad."

Falco, who said he received little help from federal law enforcement agencies ("They didn't want to touch it"), credited much of the smooth execution of the statute to Connecticut General's and Cigna's 20 expert witnesses and Internal Security Department.

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Arguments Carried to Judge Greene

Further Change Sought in AT&T Revamp

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Unless AT&T's proposed reorganization plan is modified, AT&T will continue its special relationship with the 22 Bell operating companies that are slated to be divested early next year. This would pose a disadvantage to customers as well as competitors and defeat the main purpose of the U.S. vs. AT&T antitrust settlement.

This is what several interested parties basically told Federal District Court Judge Harold Greene earlier this month in reply to AT&T's defense of its plan for implementing the antitrust settlement [CW, March 28]. The settlement is often referred to as the Modified Final Judgment.

One complaint running through the recent comments is that the reorganization plan would enable AT&T to fend off competition while limiting the user's freedom of choice. This argument involves the way AT&T and the Bell operating companies have divvied up the nationwide telephone network.

In the case of dial-up telephone service — local as well as long-distance — and Wats, the reorganization plan requires all access lines and switching equipment between the subscriber's premises and the Class 4 telephone office to be assigned to the Bell operating companies, even where these facilities are used predominantly for long-distance — within Local Access and Transport Areas — (Lata) service. However, a different arrangement has been proposed in the case of private-line offerings, such as Dataphone Digital Service (DDS).

Under that arrangement, local access facilities — including the wire centers where subscriber access lines terminate, as well as the access lines themselves — would be assigned to AT&T if they are used predominantly for inter-Lata service.

AT&T has stated that as a result, it will retain ownership of half the 91 DDS wire centers now operating within the Bell network.

All of the dial-up network's end offices are being assigned to the Bell operating companies because they "are essential to the independent provision of exchange telecommunications and exchange access," the Independent Data Communications Manufacturers Association (IDCMA) told Greene. "The [Modified Final Judgment] requires that the [Bell operating companies] have all resources necessary to provide these services independently of AT&T."

Since the DDS wire center "plays a similar role," the IDCMA maintained, the Bell operating companies must be assured ownership of these facilities as well.

"The assignment of private-line facilities is being gerrymandered so as to provide maximum advantage for AT&T," commented Charles Johnson, IDCMA chairman.

"If AT&T's encroachment into exchange service functions is not resisted, the [Bell operating companies] will not be capable of providing equal exchange access and the [Bell operating companies] will be more vulnerable to bypass."

Johnson is president of General Datacomm Industries, Inc., a major modem manufacturer that has led the fight against this provision of the AT&T reorganization plan.

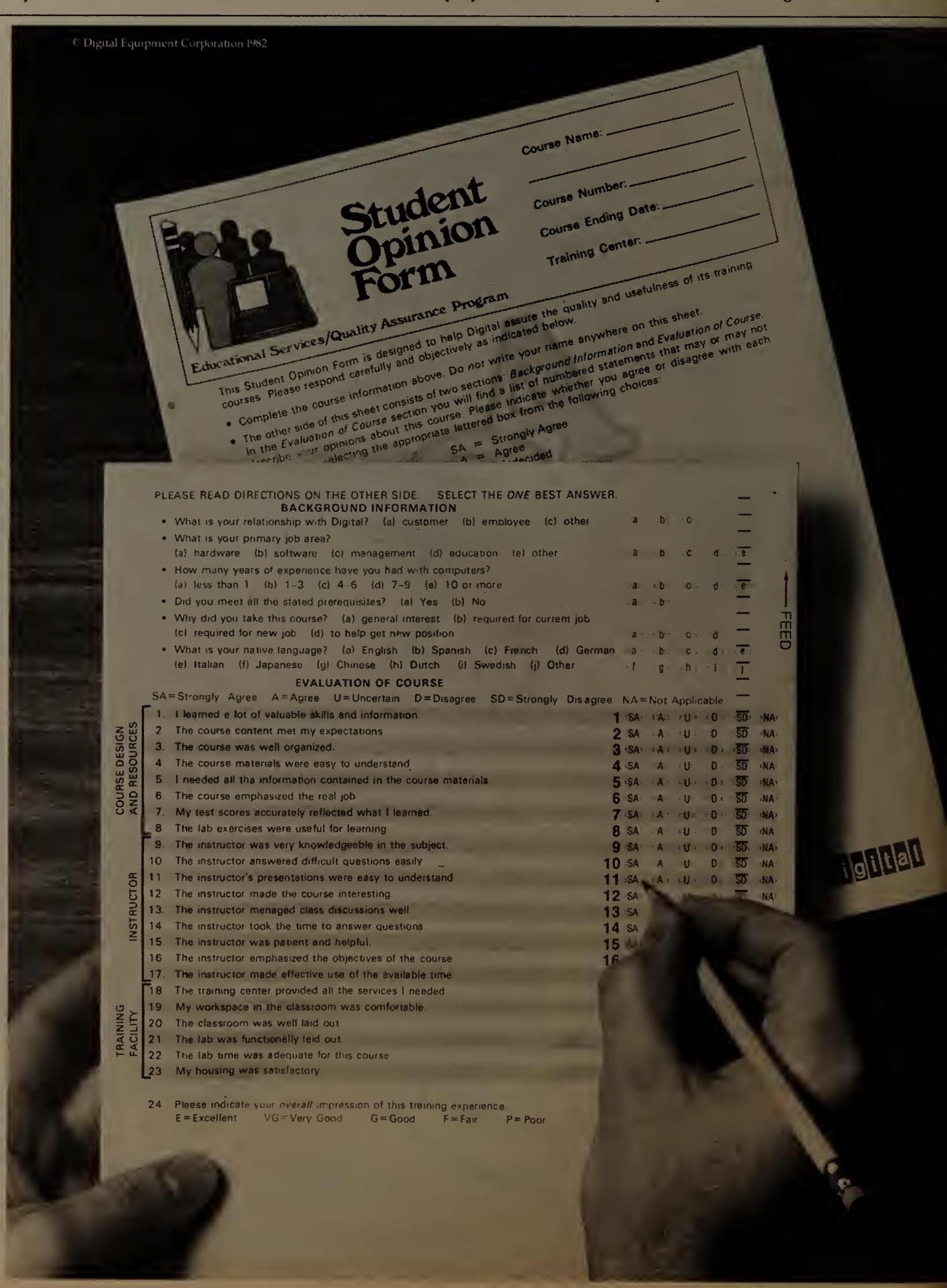
There is some evidence that AT&T is already pursuing this strategy. A few weeks ago, the Federal Communications Commission gave the phone company permission to market Terrestrial Digital Circuits service, a replacement for 1.5M bit/sec DDS. Beginning Jan. 1, 1985, Terrestrial Digital Circuit users will have to employ one of two communications protocols, both developed by AT&T.

Tymnet, Inc., another critic of the DDS facility allocation plan, said that it not only would leave AT&T in control of half the DDS wire centers now operating within the Bell network, but also would force "a customer desiring an intra-Lata DDS circuit between its premises and a DDS hub . . . to obtain it from AT&T."

Another major criticism of the AT&T reorganization plan centered on provisions establishing a Central Staff Organization, a group that would be a single point of contact between the divested Bell operating companies and federal military/civil emergency agencies. The Central Staff Organization, staffed largely by former AT&T employees, would also perform numerous operational, engineering and marketing chores the Bell operating companies otherwise would have to do on their own.

The Computer and Communications Industry Association contended that the Central Staff Organization "will perform many functions that can and should be performed locally by the [Bell operating companies]."

In its response to AT&T's defense of the reorganization plan, GTE Corp. insisted that AT&T should not be allowed to use the word "Bell" because this would enable the phone company to gain "an unwarranted competitive advantage."



Future of Videotex/Teletext Remains Uncertain

By Phil Hirsch
CW Washington Bureau

NEW YORK — The future of commercial videotex/teletext service in the U.S. is still uncertain, judging from what three experts said here last week at a seminar sponsored by Technology Transfer Institute of Santa Monica, Calif.

One problem is that the technology is still in a state of flux. Several innovations that might make videotex/teletext more cost-effective but have not yet been tested were discussed by William Von Meister (see story below). Von Meister developed The Source, the nation's first on-line information service designed for the residential market.

There also appears to be uncertainty about the role of standards in the development of videotex/teletext. Peter Winter, executive editor of "Keyfax," a national teletext magazine that began commercial operation last November, disagreed with the widespread belief that the absence of a videotex display standard is making investors hesitate to invest in the technology.

Keyfax is the nation's first commercial teletext service. Winter indicated that its sponsors — the service is a joint venture of Honeywell, Inc., Centel Corp. (an independent telephone company), Field Enterprises (publishers of the *Chicago Sun-Times*) and Satellite Syndicated Systems, a resale communications carrier — felt they had gained a big head start over competitors by being the first to offer a commercial service, so the lack of standards acted as a spur rather than a hindrance.

But consultant Paige Amidon indicated at the seminar that the Federal Communications Commission's recently adopted teletext transmission standard will have little impact on prospective investors. The reason is that the standard permits either a fixed synchronous or variable asynchronous transmission scheme to be used. In addition, it does not specify a display format and therefore does not choose between the rival systems being promoted in this country by the British and AT&T.

Even without the commission's endorsement, however, support for the AT&T-backed display format appears to be growing. At last week's seminar, for example, Winter reported his company is developing a videotex service for introduction next year that will implement the AT&T system, referred to as the North American Presentation Level Protocol Syntax (NAPLPS). This is significant since Keyfax is based on Britain's Prestel system.

Meanwhile, the American National Standards Institute is completing work on a proposed NAPLPS standard. It is likely to be adopted later this year and then implemented by all U.S. videotex/teletext decoder makers. More than 120 videotex/teletext trials or commercial services are now in operation outside the U.S., Amidon reported, and they reflect a fairly consistent development pattern. However, it is unclear whether development of the U.S. market will follow the same route.

In the other countries, she pointed out, the initial users of videotex have been business firms, and news has been one of the most popular service offerings. In the U.S., business organizations could play a similar role, she added, but the large number of video game and personal computer users may provide an alternate development path.

What's Next In Videotex?

NEW YORK — Video game terminals that can be converted into personal computers represent one technological innovation that is potentially capable of impacting the future market for videotex/teletext services. However, more adequate evaluation is needed, William Von Meister said here at last week's Technology Transfer Institute seminar.

Von Meister also suggested displaying a keyboard on a TV screen instead of providing the user with a real one. A message could then be composed with a cursor that identifies each character; the user would move the cursor by operating a video game joystick.

Videotex modem costs might be reduced by using a video game's microprocessor to perform such modem functions as error control, Von Meister added.

Von Meister and other speakers at the seminar agreed that hybrid videotex/teletext technology might be another means of making TV-terminal-based information retrieval more cost-effective. A hybrid system transmits information to the viewer via an over-the-air TV channel, but the viewer queries the data base using a standard dial-up telephone set.

This approach is believed to maximize the advantages but skirt the disadvantages of the two technologies. For example, teletext decoders cost considerably less than videotex decoders, but teletext is noninteractive.

While videotex provides two-way communications, telephone circuits cannot carry as much data as TV channels, and use of the latter path avoids the possibility of overloading telephone network switching facilities and degrading voice services.

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End-Users Losing Out on Benefits

Exec Criticizes DPers' View of Micro Software

By Robert Batt
CW West Coast Bureau

SCOTTSDALE, Ariz. — Data processing professionals are adopting a hands-off attitude toward microcomputer software, with the result that end users are not receiving all possible benefits from microcomputer technology.

This assessment was delivered recently at the International Computer Programs, Inc. (ICP) Executives Conference by Robert Adam, president of Northamerican Advanced Technology, which specializes in data base, data communications and business graphics.

"There is no question that the pace of software development is exceeding end users' and data processing staffs' ability to mold the use of these products into a meaningful framework," Adam told an audience of about 200 computer software executives.

For the most part, he asserted, users are confined to a very limited set of tools, such as electronic spreadsheets for financial information, custom packages tailored to a single application and text processing.

Tremendous Opportunity

At the same time, he added, the proliferation of microcomputer software presents a tremendous opportunity for vendors and users in the area of decision support systems (DSS).

Mainframes, he suggested, can be used to facilitate the development of DSS on micros, and this means there is a need for more integrated mainframe and microcomputer products.

Tailored to End Users

"There is a need for decision support languages tailored to the end user. What is needed is software in which the user can sit down and develop solutions to his problems. That is a far more effective use of corporate resources, and it is in [DSS] that the payback for corporations lies," he said.

Achieving such a goal will require building distributed microcomputer networks, he continued. This, in turn, means there is a requirement for communications standards to handle the link between micros and mainframes.

The development of data base software that can be used interchangeably on micros and mainframes alike is the goal. Adam warned that this will be no easy task. "Architecture issues, such as mainframe-to-micro interfaces, communications, data transfers of corporate data bases, are not being adequately addressed," he noted.

Long-Range Strategies

He called for the development of long-range planning strategies that reflect the reality of microcomputers. Systems design methodologies must take micros into account with the development of data base design tools that allow applications to be spread across both micros and mainframes.

"Software for micros will need to exhibit a greater degree of reliability and integrity than many micros that are currently on the market," he said.

Pointing to an increased need for security, he said that data for micro-based DSS would tend to include sensitive information such as a firm's market share and sales volume. "This information will be of far more significance to competitors than the operational data to be found on mainframes," he said. The level of security of the micro data bases will need to be on a level comparable to the security of mainframe data bases in DSS applications.

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Vendors Chided For Shortage Of User Ties

By Robert Batt
CW West Coast Bureau

SCOTTSDALE, Ariz. — Software vendors who fail to cultivate a lasting relationship with their users came in for some sharp criticism from representatives of two user groups at the International Computer Programs, Inc. (ICP) Executives Conference here recently.

In a session devoted to users groups, Ed Dreher, president of the McCormack & Dodge Corp. Users Group, said that "It is very important for vendors to keep in touch with their users and show that they care. You should not just drop a user after making a sale. Users have expressed a lot of bitterness when that has happened."

Dona Malefyt, president of the IV League Informatics General Corp. Users Group, noted that direct communication between users groups and the technical staffs of vendor companies is essential if a useful relationship is to be fostered.

"The user community wants a vendor to be viable and to grow and introduce new products. But the vendor needs to be out there talking to the users all the time. Users resent

(Continued on Page 24)

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Micro Explosion Seen Impacting Prices, Users

By Robert Batt
CW West Coast Bureau

SCOTTSDALE, Ariz. — The presidents of three software user groups believe the proliferation of microcomputers will have a significant impact on the future pricing of software and on user groups themselves.

The three presidents were interviewed here recently during the International Computer Programs, Inc. (ICP) Executives Conference.

Ed Dreher, president of the McCormack & Dodge Corp. User Group, said that he thinks the explosion of computing power will bring an increasing number of end-user requests for vendor installation of products because users have neither the time nor the staff necessary to carry out the installation themselves.

"Vendors will be called upon to provide installation teams, install the package on site and train users in their use," Dreher predicted, adding, "such a service will need to be reflected in the price of the software product."

The growth of personal computers means the software industry will become ever more prolific, with companies specializing in certain niches of the market, he said.

Dona Malefyt, president of the IV League Informatics General Corp. Users Group, also argued that the surge of micros will force vendors to rearrange their pricing structures.

(Continued on Page 26)

Software Vendors Chided For Shortage of User Ties

(Continued from Page 22)

the vendor only contacting them when they want to sell a new product," she remarked.

Dreher urged vendors to have a greater sense of responsibility when selling their products. "I have a real problem with some of the sales pitches I have seen. Vendors have a responsibility to sell an honest product. What the vendor does can affect a lot of people. It may only be one sale to the vendor, but to the user, if the package doesn't perform as it should, it can literally affect thousands," he told his audience.

Vendor reluctance to build bridges to other manufacturers' products also was a target of criticism at the conference.

Phil Miller, president of SAS Users Group International talked about the frustration users feel when vendors represent their systems as though they were the only ones users will ever need. "They sometimes talk as if you will never need to transfer data to any other equipment. That attitude seems contrary to those of us who have to get a job done," he said.

Malefyt claimed that vendors are very reluctant to tell users when products do not fit their environments. This creates problems for both users and vendors at a later date. "This problem is going to get far worse with the advent of relatively low-cost large mainframes and the proliferation of microcomputers," she warned.

The speakers argued that many software products and vendors do not have user groups because manufacturers view such groups as a cost rather than a benefit. This, the group claimed, is far from the truth.

Malefyt, who is also supervisor of information systems services at Chevron Oil Field Research Co., added that "The user group can be used by the vendor in developing new products and for data test sites.

"Also, it pays for a vendor to have a champion in a user company. If a product ends up not being used, the chances that the vendor will sell a new product to that customer is very slim," she said.

Miller cited the introduction of a User Feedback Award from SAS Institute as an example of close vendor-user cooperation.

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Service Traces Steps to Choosing DP Seminar

By Katherine Hafner
CW Staff

NEW YORK — There are three steps to follow when deciding which DP seminar to attend:

- Research the reputation of the organization giving the seminar.
- Get your hands on a brochure.
- Ask the seminar organization for the name and telephone number of someone like yourself who has taken the seminar.

This is the advice of Mona Piontkowski, whose Seminar Information Service (SIS) publishes the *SIS Workbook — EDP Edition*, a guide to approximately 450 DP seminars across the nation.

"Seminars cost $150 to $1,000. You really don't know what you're getting for your money," commented Piontkowski, co-founder and partner of SIS with Cathy Bellizzi. "If you're dealing with a reputable organization, then what you see is essentially what you get. But a lot of times what the brochure says and what you get for your money are two different things."

SIS' DP guide is divided into three sections: by topic, with a three-line description of each seminar; alphabetically; and by the seminars' dates and locations.

In an effort to keep up with constant changes, the guide is updated every six months and current listings are sent to subscribers once a month. "Our primary business is to give people a directory of seminars being given in their area," Piontkowski said. "We try not to make value judgments, but we do offer some advice on how to find out about a seminar."

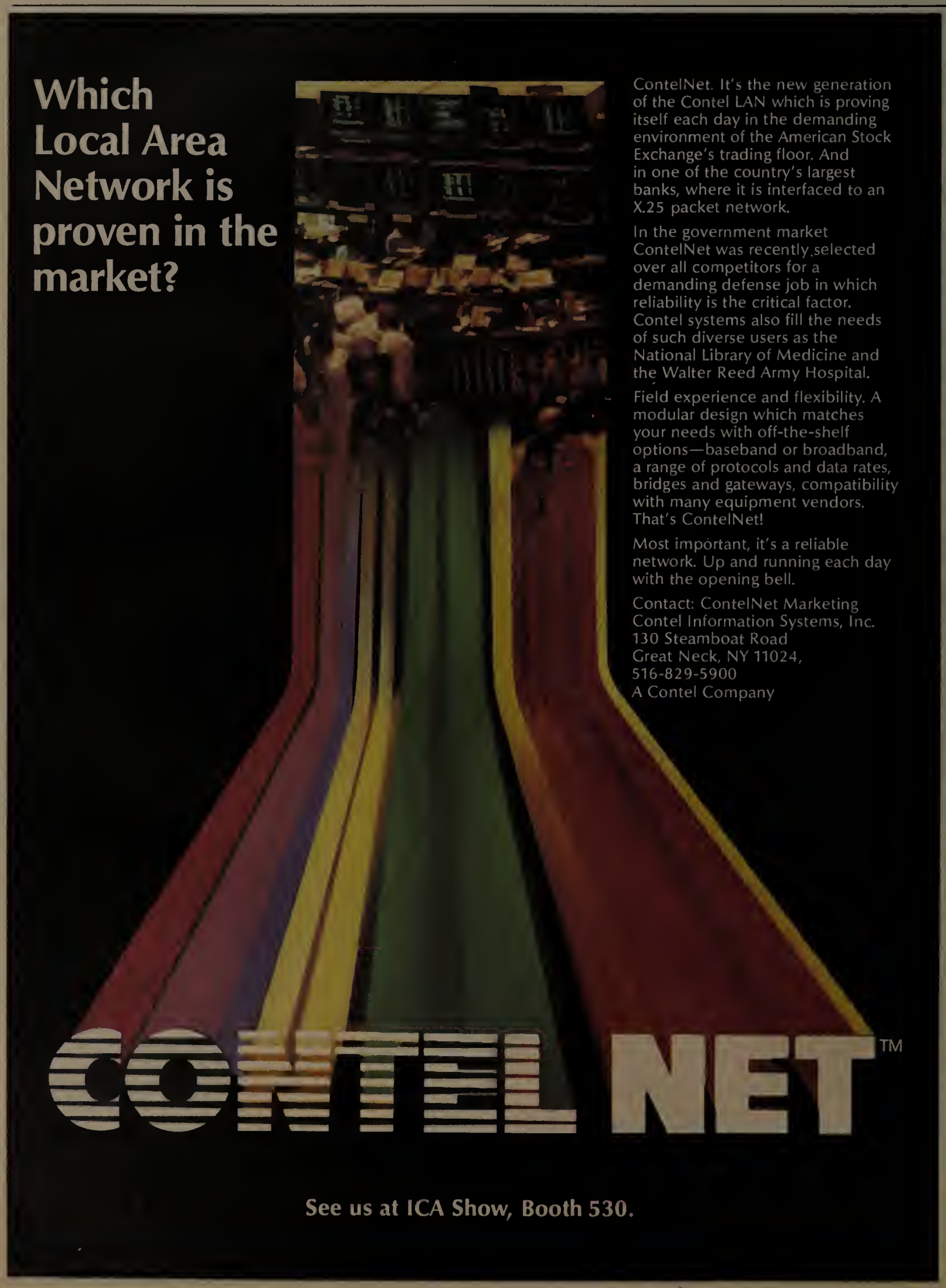
In examining a brochure, Piontkowski advised, potential attendees should find out the background of the instructor, as well as the textbook used and the year it was written. They should also determine how often the seminar is updated, she suggested.

"A lot can be learned from how professional the brochure looks," Piontkowski added. "If the brochure is haphazard, the seminar will be, too."

But the only way to really know how professionally a seminar is conducted is to hear it from someone who is "in the exact same field and who has taken the exact same course previously." Piontkowski suggests calling the seminar organization and requesting the name and telephone number of someone with the same title as yourself who has taken the seminar in the last two years.

For those disappointed by a seminar who want a refund, Piontkowski said, many organizations will issue credit toward another seminar. Those disappointed in seminars where no such arrangement exists are out of luck and out of a refund, she added.

The SIS seminar guide costs $49.50 and is available from SIS at 175 Fifth Ave., New York, N.Y. 10010.



Execs Foresee Micro Impact

(Continued from Page 24)

"A software package that might cost $5,000 to run on a mainframe can clearly not cost that much if it is to run on a micro. Software packages will come to be priced according to their support costs, which will obviously differ between micros and mainframes. Vendors will need to sell their support packages more heavily," she said.

Phil Miller, chairman of SAS User Group International, urged vendors to take the initiative in providing micro-to-mainframe links. "If they do not take the lead in this area, other manufacturers will spring up with add-on equipment, and then the original vendors will find themselves involved in tricky commercial relationships," he warned.

IBM in particular will need to be more forthcoming with information for users who want to tie different vendors' packages together, according to Malefyt. "IBM doesn't open its mouth nearly often enough. It is going to have to be more generous in its stance with other vendors," she commented.

Malefyt also warned data processing professionals in user companies about the implications of microcomputers. "On the whole, DP people are frightened of personal computers and are trying to maintain control over users. The DP world will need to change its attitude and give the user community some guidelines, as well as encouraging vendors about what kind of products to bring out."

Discussing how micros will affect user groups, Malefyt said that as personal computers infiltrate the offices of top corporate managers, user groups will have to gear their attitudes more toward the issues that concern senior management. "With some DP budgets being cut back, the user groups that are heavily populated with DP people are going to suffer the most. What will save these groups will be the ability of users to get nontechnical people on board — people who have never attended user group meetings before," she argued.

Such a trend is likely to cause problems, Miller observed. Users who are not knowledgeable will be forced to recommend hardware and software solutions to their peers.



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—John Skasick, Software Systems Manager, Maryland Cup Corp.

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Data Encryption Software: Who Is Using It?

By Lois Paul
CW Staff

Just the mention of the term data encryption evokes images of cloak-and-dagger secrecy and intrigue. Not surprisingly, the installations that are using data encryption software are not exactly anxious to talk about how and why they are employing these packages to protect their data.

Data encryption software is designed to encode data, generally via a user-supplied group of characters called a "key," to make it illegible to unauthorized users who do not have the correct key to decode it.

Some of the users of these types of software are in the military or government-related agencies, which can explain their reticence. For example, one state government is using encryption to prevent investigative reporters from getting into its sensitive files.

Harris Corp., a Fort Lauderdale, Fla., computer manufacturer, is evaluating the use of Prime Factors, Inc.'s Descrypt/FS for its internal word processing system. "The documents we produce sometimes contain sensitive data," a spokesman for the firm explained.

Harris has been running the software since August on its own systems from the 300 series up.

Other users of encryption packages are universities. One of them, Pennsylvania State University in State College, Pa., is running Computation Planning, Inc.'s Desqik on an IBM 3081 under MVS. Herman Knoble, a research associate at Penn State, said the school felt the need for encryption to protect material stored on the system such as exams and faculty proposals, which are transmitted via a network that connects universities across the country.

"It is not like the thing is so valuable. It is the idea that technology can give the kind of security that even government personnel, who have a potentially infinite amount of resources, can't touch," Knoble said.

Penn State tries to make its files shareable by default so professors and students can work together on projects. "But on the other hand, we can fix it so they can't," Knoble said.

Almost everyone at Penn State keeps a few files encrypted — among them a business manager who encrypts files with budget information and Knoble himself, who encrypts his curriculum vitae.

A physics laboratory within another university has been using Bi-Hex Co.'s Cryptex for a number of years, running it on an IBM 3033. Cryptex, a keyless encryption method that does not emulate the National Bureau of Standards' Data Encryption Standard (DES), was chosen before the DES standard was set, a spokesman explained.

In addition, the lab has built a front end to it to support user keys. In this way, "the user has control of the safeguarding of the key and implementation thereof, but Cryptex is the base for the algorithm," he explained.

Although some users have complained about the drain on resources by encryption packages — particularly by implementations of DES — the lab has not been able to measure this because encryption is just one of the applications it runs, and there is no way of knowing when someone is encrypting or decrypting data.

Basically, the lab is using encryption as another layer of protection for information. This is also the way David Smith, director of systems for the Office of the Auditor General in Tallahassee, Fla., perceives the usage of encryption software. "I believe encryption devices give you one step to depend on. If that is broken, then your notification devices can come quickly into place."

Smith worked on "An Analysis of State Government Use of Hardware and Software for Protection of Computerized Data," a July 1980 report prepared by the Committee on Security and Privacy and Confidentiality that is part of the National Association for State Information Systems in Louisville, Ky. The study was an attempt to set up some kind of a base statute regarding security that states could pick up and embellish or adopt to deal with crimes against computer information.

Gmis Meet Set For June 12-16

SALT LAKE CITY, Utah — The Government Management Information Sciences (Gmis) 1983 Conference is slated to take place here June 12-16. The theme of this year's conference is "Changing with Change and Meeting the Challenge."

Topics on the agenda for the event include DP-related job stress, computer contracts, the role of microcomputers and minicomputers, the relationship between DP managers and end users, information centers and lease financing. Also on hand will be leading hardware and software vendors displaying their wares in a concurrent exhibit.

Conference registration is set at $85 for Gmis members and $100 for others.

More information is available from Allen Dunn, director of support services at Salt Lake County, 151 E. 2100 South Building 4, Salt Lake City, Utah 84115.



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Calls for International Cooperation

Joint R&D Report Ready for Economic Summit

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A number of international cooperative research and development projects in science and high technology have been proposed for discussion at next month's economic summit meeting between the U.S. and its major allies.

The joint R&D programs will be brought up when the summit, to be held at Williamsburg, Va., turns to consideration of the complex relationships between governments and the private sector in science and high-technology issues.

The program proposals would include joint efforts in advanced robotics, the impact of new technologies on established industries and the application of new technologies to education, vocational training and culture.

As part of the preparation for the summit, a working group on technology, growth and employment, established at last year's summit at Versailles, France, has readied a report discussing science and technology issues and recommending the cooperative science and technology programs.

Prompted by French Concern

The working group resulted from Versailles discussions prompted by French concern about the growing effect of new technologies on employment, trade and international relations.

The Williamsburg meeting, like the French summit, will bring together the heads of state of the U.S., France, the UK, West Germany, Italy, Canada, Japan and the European community.

Dr. George Keyworth, President Reagan's science adviser, represented the U.S. in the working group.

The working group's report, released here recently, noted that "advances in information technology, combined with progress in computers, video recorders and telecommunications, can transform education, increase the efficiency of our organizations and permit better use of human and material resources."

The report, which also cites the large-scale incorporation of microprocessors into numerous existing technologies, sought to define the proper role of governments in domestic and international efforts to harness these new technologies.

Among the findings and recommendations of the working group were:

- Fundamental scientific research is one source of technological progress in industry and should be given special support by governments.
- In an age of rapid technological innovation, special training programs are necessary to promote flexibility, mobility and adaptability of labor.
- More attention to the problems of public acceptance of new technologies is needed.
- Special attention should be paid to the rejuvenation of mature industries through the use of science and technology.
- Developed countries should assist developing nations create scientific and technological infrastructures, but developing countries, as sovereign states, must be allowed to develop their own policies and priorities.
- The market introduction of new technologies is primarily the task of the industrial and commercial sectors, but governments should support fundamental science and long-term, high-risk R&D activities.
- The summit nations must reaffirm their commitment to removing barriers to an open multilateral trading system, to strengthening trade rules and to promoting the development of trade in new technologies.
- Given the importance of science and technology, they should receive due consideration in all policy decisions for national development and international cooperation.
- With current economic difficulties and corresponding budget constraints, it makes sense to cooperate internationally, particularly in long-term, high-risk R&D projects.

Discussing the role of governments in science and technology, the working group said "the demarcation of the [private and public] sectors' respective roles is not easy and depends on the individual situations in our countries.

"This is, in any case, less important than the establishment of workable mechanisms and a suitable climate which allows both sectors to function together in an optimal manner," the report said.

To provide that climate, the report concluded that governments, remembering that "innovation is inherently risky . . . should help to create an environment which on the one hand provides a predictable regulatory framework, low inflation and interest rates and a fiscal structure that rewards enterprise and, on the other hand, facilitates the acceptance of new technologies in the workplace and by the public more generally."

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83A-681—ISO World—May 9
83A-689—Computer Systems News—May 2
83A-690—ComputerWorld—April 25

U.S. Army Opens Second Regional DP Center

By Patricia Keefe
CW Staff

NORCROSS, Ga. — The U.S. Army continued its march toward state-of-the art information processing with the recent opening of its second regional DP center here. On March 1, the Southeastern Regional Data Center here became the second of five planned large-scale data processing centers that will result from a 10-year, $656 million effort.

Dubbed "Project Viable" (Vertical Installation Automation Baseline), the project represents a "major revision of the way the Army does business," according to Nancy Dunn, public liaison officer for the U.S. Army. Instead of taking the safe approach and merely upgrading current equipment, as advocated by Computer Science Corp., the Army chose to go with Electronic Data Systems Corp.'s (EDS) proposal, Project Viable. The project goal calls for "a totally interactive system," she said.

The data center here will serve eight southern bases and like the other regional centers, will be used to centralize personnel, logistic, financial and administrative information.

In addition to the construction of five regional data centers, Project Viable will provide the capability to take advantage of any new technologies introduced. "Usually, the government is stuck with what it bought," she observed.

Project Viable is a case in which "the government recognized that the foremost brains of the industry were not in the Army and chose to buy the best, buying themselves out of 1969 technology," Dunn said.

Plans to install 200 to 500 Raytheon Data Systems Co. PTS-2000 CRT display terminals on each base — an estimated total of 18,000 terminals — will trigger a massive five-year DP training program, according to

(Continued on Page 32)

CPU Keeps Close Watch On Army's Air Defense Gun

NEWPORT BEACH, Calif. — The U.S. Army's newest air defense gun system is in full production with the aid of a computer that has helped to eliminate drawing boards, pencils and paper.

The Divad Division of Ford Aerospace and Communications Corp., the prime contractor for the project, is producing the Army's Sgt. York Division Air Defense Gun System, which is mounted on a modified M48A5 tank chassis to defend against enemy aircraft and ground targets.

The system features optical tracking of targets, automatic target classification and the ability to search, aim and shoot on the move at the rate of 300 rounds per minute from each of the twin guns.

Divad uses an IBM 4341 processor running an IBM program called Computer Graphics Augmented Design and Manufacturing (Cadam), which stores about 15,000 engineering drawings on the gun system.

"We handle design and drafting steps simply by pushing computer terminal buttons," noted Thomas F. Morrissey, director of manufacturing for Divad. "Combining this activity with the use of numerically controlled tools and manufacturing saves time, manpower and costs."

At any time, explained Sherilyn Anderson, Cadam project manager, engineers can retrieve a drawing, display it on a terminal, then study, modify or store it for later use. The computer can also merge a drawing with the appropriate text to provide automatically manufacturing instructions that workers can follow.

In a separate operation that uses the same basic information in the computer, engineers can design the tools used to produce the parts for the gun system. For numerical control program design, programmers can display an appropriate drawing on the terminal screen, then plot the path the tool must take to produce the part.

The resulting geometry is converted into a numerical control tape to guide the tool.

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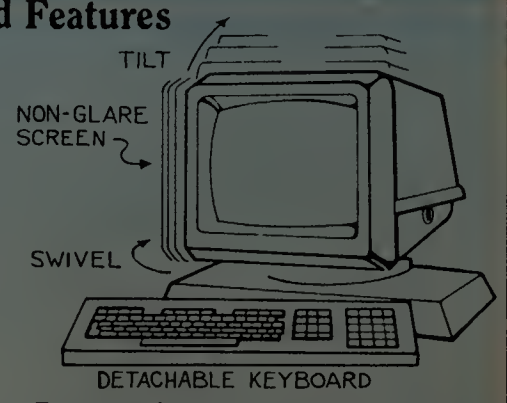
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Law Firm Defends Use of Office Automation

BOSTON — Word processing was just the first step on the road to office automation for a law firm here.

Late in the 1970s, the firm of Deutsch, Glass and Brooks sought an initial phase of office automation that would assist with its growing word management demands and enhance office productivity.

Three years after the purchase of a word processing system, the firm took yet another step and decided to upgrade its entire system to include a computerized workstation for every staff member. It was determined that the purchase of additional word processors would be cost-prohibitive, so the firm decided to seek a system that would provide a method for sharing data at a low cost and handle immediate administrative tasks while remaining flexible enough to upgrade for future applications.

The criteria for selection of the system included a multiuser, multiprocessor microcomputer with a hard disk for memory storage. After a survey of several microcomputer systems, in May 1982 the firm installed OSM Computer Corp.'s Zeus1, which incorporates OSM's original multiuser, multiprocessor computer with a Winchester disk.

According to Mike Claire, who is in charge of technical support for the law firm, the multiprocessor architecture provides each user with a Zilog, Inc. Z80A microprocessor, 64K bytes of random-access memory and other state-of-the-art DP technology.

Deutsch, Glass and Brooks selected Zeus1 because it provides a cost-effective, flexible method for workstation expansion and includes OSM's Muse operating system, Claire said. Muse provides system compatibility with widely used Digital Research, Inc. CP/M software application programs and languages.

With the system in place, Claire said, the firm has increased efficiency in word processing, time and billing, financial modeling and keeping the general ledger. By using a customized spreadsheet program, financial modeling sessions are now completed in half the time that they took previously, and clerical personnel spends 25% less time in preparing the first copy of a typical 20-page brief.

The system is currently used primarily by clerical personnel. "Our goal is to provide a terminal for every lawyer in the firm," Claire said, enabling attorneys to make better decisions and be better prepared for court appearances or depositions.

Army Opens Second DP Site

(Continued from Page 30)

Dunn. About 57,000 Army personnel, primarily terminal operators and members of the management team, will be trained on the Viable subsystem.

Currently, 47 Army bases across the country are struggling with outdated systems that on an average include an IBM 360/50 or 4331 processor and several terminals. Data entry is handled by keypunch personnel, with output eventually transferred to magnetic tape. The DP facilities run three shifts, six days a week, 24-hours a day. Due to equipment breakdowns, some bases are losing two to three hours of processing time each day, Dunn said.

Project Viable will involve installing IBM 4331 front-end processors in the regional centers and up to 500 terminals scattered throughout the base. Under the new system, data can be entered directly from the work location, where errors can be immediately detected. Users will have the capability of obtaining information at their workstations, with a response time of two to 10 seconds, according to Dunn.

Operators on each base will use IBM 3278 Model 24 CRT display consoles. Other equipment includes NCR Comten, Inc. communications processors; Storage Technology Corp. (STC) Models 8350 and 8650 disk drives and Model 8370 tape system and IBM and STC printers.

Dunn described the data centers as Orwellian in appearance, almost "paperless and peopleless — computers monitoring computers." The data centers will be staffed primarily by about 110 EDS employees, supervised by about 10 Army technicians.

Information collected at the individual bases will be sent to the nearest regional data center for processing and centralization of records. Data will travel from user terminals to an NCR Comten 3650 communications processor on base to an NCR Comten 3690 to the IBM 4331 and finally to one of two Amdahl Corp. 470 V7 mainframes at the data center.

The primary software contractor is Applied Data Research, Inc., and Dunn projected a gradual period of changeover from batch to on-line programming.

The first center that went on-line is located in Washington, D.C. Other planned sites include Louisville, Ky.; Monterey, Calif.; and Killeen, Texas.

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Graphics Allows Flexibility

Food Distributor Cuts Prep Time With Plotter

SCHILLER PARK, Ill. — A computerized plotter has reduced supermarket display preparation time.by 75% for a food broker here.

Sales Force Companies, Inc. (SFC) started out nearly a century ago as a distributor of bulk goods. Over the years, the firm evolved into a food manufacturer's representative with four major functions: to introduce, promote, service and report on food products to the manufacturers of those products.

Today, the employee-owned company serves 23 central states, ranging from Indiana in the Midwest to Colorado and New Mexico in the West. SFC comprises three separate sales systems serving the food service, consumer retail and industrial markets.

The firm bought its first computer system almost 16 years ago. "We have always tried to keep pace with technological innovations that help us provide better service," explained Chairman and Chief Executive Marsh Blackburn.

"In fact, we watched the development of computer graphics very closely," he added. "We wanted to provide our customers with a good space-allocation program for their grocery shelves.

"However, we couldn't justify graphics costs for this one function," he went on. "We needed to be able to do other things in order to make graphics a cost-effective tool for us."

The first glimmer of hope in that direction occurred when Logistics Data Systems, Inc., a Baltimore-based software house, marketed its Spaceman program, designed to handle 35 items and 16 shelf positions.

Designed to run on an IBM System/3 computer, the system also incorporated the eight-pen Hewlett-Packard Co. HP 7220C plotter, offering capabilities beyond the shelving plans.

"We decided that we could take Spaceman and convert it to our needs," Blackburn recalled. The first step involved converting to Cobol so that the software would run on SFC's 512K-byte Digital Equipment Corp. 2080 computer. Then the software was expanded to handle 68 items and 72 positions per shelf. The result — implemented a year ago — was renamed Sales Spacer.

The HP 7220C plotter, a part of the original system, was retained because of its cost-effectiveness and high-quality reproductions, Blackburn explained. Featuring eight-color pens, the plotter can produce up to 96 different patterns.

"In the past, we drew out our shelf positions by hand," Blackburn said. "This took at least an hour. If there were changes, it meant redrawing the entire shelf. It was time-consuming and — as with any manual task — there was a lot of room for error.

"With the plotter, it takes about 15 minutes to produce the first drawing," he explained. "After that, changes can be made in seconds. In fact, our sales staff can be much more creative and experiment with various displays. This means that the customer gets better service in the long run."

Using 24 DEC Decwriter and 22 General Electric Corp. Terminet terminals, each of the company's 23 sales divisions feeds the statistics necessary to create a drawing into the computer. These statistics — collected in the grocery store by retail personnel — include a product description, graphic code, product size and dollar sales per product.

Graphics capabilities go well beyond shelf display drawings and are also used to monitor financial and sales data, Blackburn said.

"The sales data is particularly useful," Blackburn said. "Not only is a picture worth a thousand words, but in the food brokerage business, it may be worth several thousand dollars."

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Doctors Keep Tabs With Mini-Based System

MADISON, Wis. — A computer-based medical record-keeping system has allowed doctors here to hone their judgment skills by keeping a running score of their past performances.

The system, developed by the University of Wisconsin-Madison, keeps track of medical decisions made by physicians and compares them with subsequent patient progress reports.

First implemented in April 1982, the system is being used in the university's rehabilitation and general internal medicine clinics, where doctors make continual predictions on the length and effectiveness of therapies and treatments.

According to Dennis Fryback, associate professor of industrial engineering and preventative medicine, the project is based upon research in psychology and computer-aided medical decision making.

"Doctors rely heavily on their judgment skills for treating patients. But judgment is affected by both imperfect memory and a normal sense of self-confidence," Fryback asserted.

He went on to cite psychological research indicating that people generally have more confidence in their own judgment than is warranted.

Fryback heads the system design research team that developed a series of computer programs that enable doctors to keep at their fingertips a history of their prior medical decisions, as well as their outcomes. This "clinical feedback," as Fryback called it, helps doctors see how accurate their judgments have been so they can learn from past performances.

With the system, which runs on a Data General Corp. Eclipse 330 minicomputer, doctors diagnoses are entered into a terminal along with treatment, prescription and the percentage probabilities that their recommendations are correct. The computer tracks patient treatment, recovery and the doctors' predictions on how well their prescribed treatment would work.

A doctor may also enter assessments of how well the patient will comply with instructions and how long the treatment may take.

"This kind of idiosyncratic information is missing from normal medical charts, but it is important data for physicians to have," Fryback related.

The computer responds by reporting the results of other cases in which similar assessments were made, permitting doctors to calibrate their judgments, if necessary, to correspond with prior successful decisions.

The feedback system has already met with good results, Fryback said. "One clinician, for example, discovered a tendency to set goals too low for his patients.

"As the system becomes routine, other doctors will undoubtedly learn things about their judgment skills they never suspected," he predicted.

Fryback also believes the feedback system could cut medical costs. In his opinion, better diagnostic judgments could reduce the need for costly test procedures to discover the nature of diseases or ailments.

While it may be some time before the feedback system is available for general use, with hospitals just now gearing up for computerized record-keeping, Fryback anticipates that it could become an integral part of all hospital computer programs by the end of this decade.

Courses Offered On IBM Micro, Visicalc Software

NAPERVILLE, Ill. — Deltak Microsystems, Inc. has announced two self-teaching courses, "Teach Yourself the IBM PC" and "Teach Yourself Visicalc."

The course for the IBM Personal Computer is an interactive self-teaching tool that instructs in systems and keyboard operations, applications control and the use of menus to select activities, including the creative use of graphics, sound and color, a spokesman said.

To participate in the course, users must have an IBM Personal Computer running under DOS with a minimum of 64K bytes of memory, at least one diskette drive and either an IBM monochrome or color CRT terminal. The course comes with a system diskette and user's guide and operations book.

"Teach Yourself Visicalc" was designed to familiarize users with the basic features of Visicalc, a product of Visicorp.

The course works by helping the user create an actual budget worksheet, guiding the user through the col./row format of the Visicalc worksheet, teaching the meaning of the terms "cell," "coordinate," and "cursor" and actual cursor and window-scrolling movement.

Users of "Teach Yourself Visicalc" must also have access to an IBM Personal Computer running under DOS with a minimum of 64K bytes of memory, at least one diskette drive and an IBM CRT terminal.

Each course ranges in price from $65 to $100. More information is available from Deltak Microsystems, 1751 W. Diehl Road, Naperville, Ill. 60566.

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Results Worth Duplicating

Copy Dealer's System Tracks Field Engineering

SAN DIEGO — By automating a part of the business that is not normally computerized, a copy machine dealer here has achieved results that are worth duplicating.

Copy-Line is a 20-year-old dealership that operates three branch offices in California. The company is structured with separate profit centers in sales, supplies and field engineering. In 1979 Copy-Line brought in IBM alumnus Chuck Rouse to computerize its field engineering division, which had been plagued by control problems engendered by a manual tracking system.

There were few examples from which to work, according to Rouse. "Most dealers don't understand the enormous problem of putting 50 people in the field and expecting them to produce revenue while having no control at the organizational level," he said.

Starting with a Digital Equipment Corp. PDP-11/03 minicomputer that was gathering dust in a corner of the office, Rouse contacted acquaintance John Fall at Computer Software Development Co. in San Diego to develop a package to track and report field engineering service calls and the revenue they generated.

The results speak for themselves, Rouse commented. Profits in Copy-Line's field engineering division jumped 55% in 1981 on revenue gains of 47%. Profits were up another 52% in 1982. "The bottom line was control," he commented.

Maintenance at Copy-Line comes under two basic categories. A prepaid maintenance contract provides unlimited service on a customer's machine for the duration of the agreement. Customers without a maintenance or warranty contract are billed for labor and materials as they are required.

Copy-Line's field engineering system uses a central data base containing all the information it needs on each customer site, including name and address, machine type, maintenance coverage, warranty expiration date, the name of the field engineer assigned to the installation and information about the most recent service call.

Each field engineer completes a daily service call report listing the time each call was received, the time the engineer was on site, what corrective action was taken and the parts used. The reports are keyed into the system daily, with the data going to the central data base as well as a variety of sub-data bases.

From this information, field engineering management generates a wide range of reports on request, Rouse said. One of these is a machine history, which shows a complete service call record of any copier requested. Another data base records all parts used on a service call and subtracts them from the field engineer's inventory.

Number of Service Calls

The system has enabled Rouse to generate reports showing the number of service calls for a specific machine or group of machines, the manager said. A history analysis program provides a list of machines that have had more than a predetermined number of calls in a month. "We service about 8,000 machines in the San Diego area, and we like to know which ones are the poor performers," he said.

Another function tracks individual machines by the number of labor hours required, the parts needed and the copy meter reading of each service call.

"With this information, I can find out what the cost was per copy for that machine," Rouse said. "I can quickly go back and find out if I'm charging the customer enough for that maintenance."

Field engineering has also been better able to track service agreements, most of which expire after a predetermined number of copies or on a certain date, whichever comes first. "Prior to computerization, there was no way to track the expiration date by the number of copies," Rouse said. "Engineers simply went by the calendar." Copy tracking allows Copy-Line to identify customers whose contracts are due to expire and alerts field engineering that they may bill for the call.

Inventory tracking has reduced spare parts usage, Rouse noted. "You always have the problem of engineers throwing spare parts at a problem," he said. "Most field engineers carry $8,000 or more worth of parts in their cars. We had no way of tracking that. With the computer, we can see for every call an engineer makes how many parts were used. We can identify the high parts users." Rouse noted that in 1982 the division's inventory went up while parts usage dropped.

Although field engineers are tracked more closely, Rouse said he has encountered no major opposition to the automation. "The field engineers want to feel they're doing a good job," he said, adding that pay raises and promotions at the company are awarded on the basis of merit.



Engineer Says Voice to Play Major Role in OA

By Susan Blakeney
CW Staff

NEW ORLEANS — While a whopping 69% of an executive's day is spent communicating verbally, either in person or over the phone, most people do not think of voice as having a "role" in the office, according to Ken Bice, a human factors engineer with Texas Instruments, Inc.

Furthermore, voice is such an integral part of the office that automating the office is not complete until voice processing is included, Bice claimed at TI's National Users Group meeting, TI-MIX, which was held here recently.

Enumerating the benefits of automating the functions of telephone answering and voice messaging, Bice claimed, "Many phone calls are actually interruptions to the receiving party. Only a small portion require two-way communication that must occur at that point in time."

Bice produced statistics showing that 50% of all phone calls could be one-way communications — in other words, the information only needs to flow in one direction. "A reliable telephone answering system or a voice messaging system could reduce interruption and increase a worker's productivity immensely," he said.

Voice messaging, Bice explained, is simply a recording of a spoken message that can be played at the receiver's convenience. "Besides reducing interruptions, voice messages save time by eliminating the transcription of the message into written or typed form," he noted.

Bice predicted that within the next few years, more and more applications using voice will support the automated office even further.

"Voice messaging will become widely used within large corporations using voice processors. The concept of compound documents, which contain text, voice, data and graphics, will change the way people use computers in general. Presentations will soon consist of the text and graphics to be displayed, plus a recorded voice description," he said.

"Reports as we now know them will change considerably when everything is online, with voice interspersed with text," he theorized.

An area considered most promising by Bice is that of the "extended office," whereby people can access all of their computer's capabilities from anywhere with just a telephone. "The productivity increases of such an extended office are considerable," Bice concluded.

TI Declares New Strategy

NEW ORLEANS — Given the "fast-changing technological environment" and "sweeping advances in the micro direction," Texas Instruments, Inc. has largely abandoned its minicomputer mentality and declared a new market strategy. The new strategy calls for an IBM-compatible distributed workstation-based local-area network product family with voice capabilities for the '80s.

Ken Wickham, TI's business and product management manager based in Austin, Texas, ran TI's plans up the proverbial flagpole at TI's National Users Group meeting, TI-MIX, held here recently. He announced TI's product themes, which are ease of use, connectivity, enhanced processing power on a workstation and portability.

While the product line that will fulfill this strategy will not be officially unveiled until the third quarter of this year, Wickham said TI would be delivering powerful 32-bit workstations based on Motorola, Inc.'s 68000 architecture, capable of functioning as file servers, print servers and communications servers.

Wickham said the local-area network strategy involves IBM-compatibility and an IEEE 802 token ring. The components of this system will be based on Xerox Corp.'s Ethernet, he explained, and the local-area network will be transparent to the application software.

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University Goes to In-House

System Gives Students Hands-On Learning

NEW YORK — Everything from Old Testament bibliographies to professors' paychecks will eventually be processed on a new computer system recently installed here at the nation's largest Catholic university.

St. John's University, with two campuses in New York City serving more than 18,000 students, has replaced its old time-sharing mode of operating with an in-house Honeywell, Inc. Model 68 DPS CPU with Multics software.

Since the installation of the system, the school has gained tremendous DP improvements and some students are showing computer expertise that is "really astonishing," according to Dr. Mary F. Maloney, the school's vice-president for computer operations.

Prior to acquiring the system, the university met its instructional and research computer needs by hiring two outside time-sharing companies. In addition, it used an older Honeywell Model 1250 and a Level 6/43 computer for administrative DP.

The Model 1250 is currently in the process of being upgraded to a Level 66 computer. The batch processing of the old system took too long for the university's current needs, Mahoney said, and students needed a more effective system with which to work.

Terminals Link System

Now, approximately 100 Lear Siegler, Inc. and Digital Equipment Corp. terminals link the new system with both campuses, allowing students in such diverse disciplines as pharmacy, mathematics, theology and English to access the computer. Mahoney said that all groups in the student body are benefiting from the new computer system.

"We have three groups of students who use the system, all in different ways. The primary users are the computer science students. They experiment with various programming languages, use the university's data bases to compile information and even work with the system's operating system," Mahoney said.

The second group of users, the business students, use the system primarily for statistical data gathering, Mahoney said. She noted that all business students at St. John's are required to take an introductory course in DP that includes Basic, and they are also required to take two semesters of statistics.

"The business students find the statistical software packages we can use on the system to be particularly helpful," Mahoney said.

Doctoral candidates make up the last group of student users. Mahoney maintained that research in science and the social sciences has been markedly up since the new system was put in place.

She noted that prior to the installation of the Multics time-sharing configuration, students used the Dartmouth College time-sharing facility. "I'm especially excited about how quickly we are able to get at information. Multics is much faster than the Dartmouth time-sharing system we used to use," she stated.

A primary consideration for St. John's in choosing a new computer system was ease of use for students and faculty alike, Mahoney said. She pointed out that the Multics software gives users a "free reign" in using the system without destroying system integrity. "This system is an end-user system. It needs no job control language to run jobs so students are not bogged down with mechanical operations," she commented.

Another advantage to converting to an in-house system is that computer science students now feel more free to use the computer. "A disadvantage we had with time-sharing was that companies didn't like students experimenting with the equipment. Another problem was trying to get documentation — it was next to impossible. Now, since our in-house staff is becoming expert on Multics, students can walk in and talk to anybody and get reference materials that weren't available before," Mahoney noted.

On the administrative side, the new system has generated "tremendous improvements," according to Mahoney. In the admissions process, for example, material that used to take three weeks to process and mail now takes two days, she noted.

Mahoney said that plans already call for an additional 100 terminals to be added to the system in 1984.

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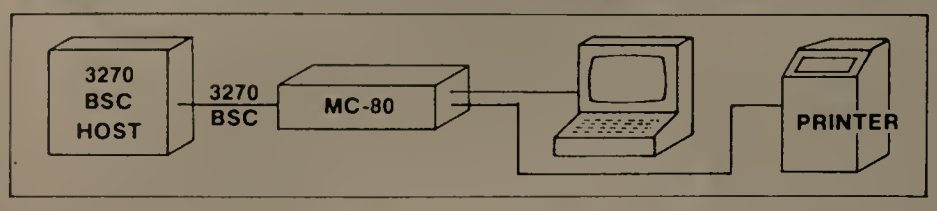
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Calendar

Week of May 1

May 5, Saddle Brook, N.J. — **Micros and the MIS Manager: Studies and Solutions Seminar.** Contact: Time Sharing Resources, Inc., 625 From Road, Paramus, N.J. 07652.

Week of May 8

May 10-13, Boston — **Structured Programming: Techniques for Productivity.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

May 11, New York — **Advances in Computer-Aided Management.** Contact: Michael A. Van Dyk, Association for Computing Machinery/Institute for Management Sciences, 88 Lexington Ave., 16-B, New York, N.Y. 10016.

May 12-13, Boston — **Voice Mail and Messaging Systems: How to Select, Implement and Manage.** Contact: Business Communications Review, 950 York Road., Hinsdale, Ill. 60521.

Week of May 15

May 16-18, Boston — **Structured Technology for Systems Design.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

May 16-18, Summit, N.J. — **Job Control Language.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

May 16-19, New York — **Fundamentals of Data Processing and Telecommunications.** Contact: National Institute for Management Research Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

May 16-19, New York — **IDMS Applications Programming Workshop.** Contact: Comped Technical Corp., 1133 Ave. of the Americas, New York, N.Y. 10036.

May 17-19, Philadelphia — **Conflict Management in the DP Environment.** Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

May 18, Washington, D.C. — **DP System Maintenance.** Contact: U.S. Professional Development Institute, Department K, 1805 Powder Mill Road, Silver Spring, Md. 20903.

May 18-19, Denver — **Micros, Desktop Technology and Local Networks.** Contact: Mary Willard, The Seminar Broker, 3212 W. 133 Ave., Broomfield, Colo. 80020.

May 18-19, Washington, D.C. — **Telephone Bypass Opportunities and Local Access.** Contact: Telestrategies, Inc., Suite 102, 6842 Elm St., McLean, Va. 22101.

May 18-20, New York — **Artificial Intelligence Applications for Business.** Contact: New York University Symposium Series, Computer Applications and Information Systems Department, 700 Merrill Hall, 90 Trinity Place, New York, N.Y. 10006.

May 18-20, Alexandria, Va. — **Advanced Data Retrieval.** Contact: Datatel Minicomputer Co., 3700 Mt. Vernon Ave., Alexandria, Va. 22305.

May 18-20, New York — **Word Processing VII.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

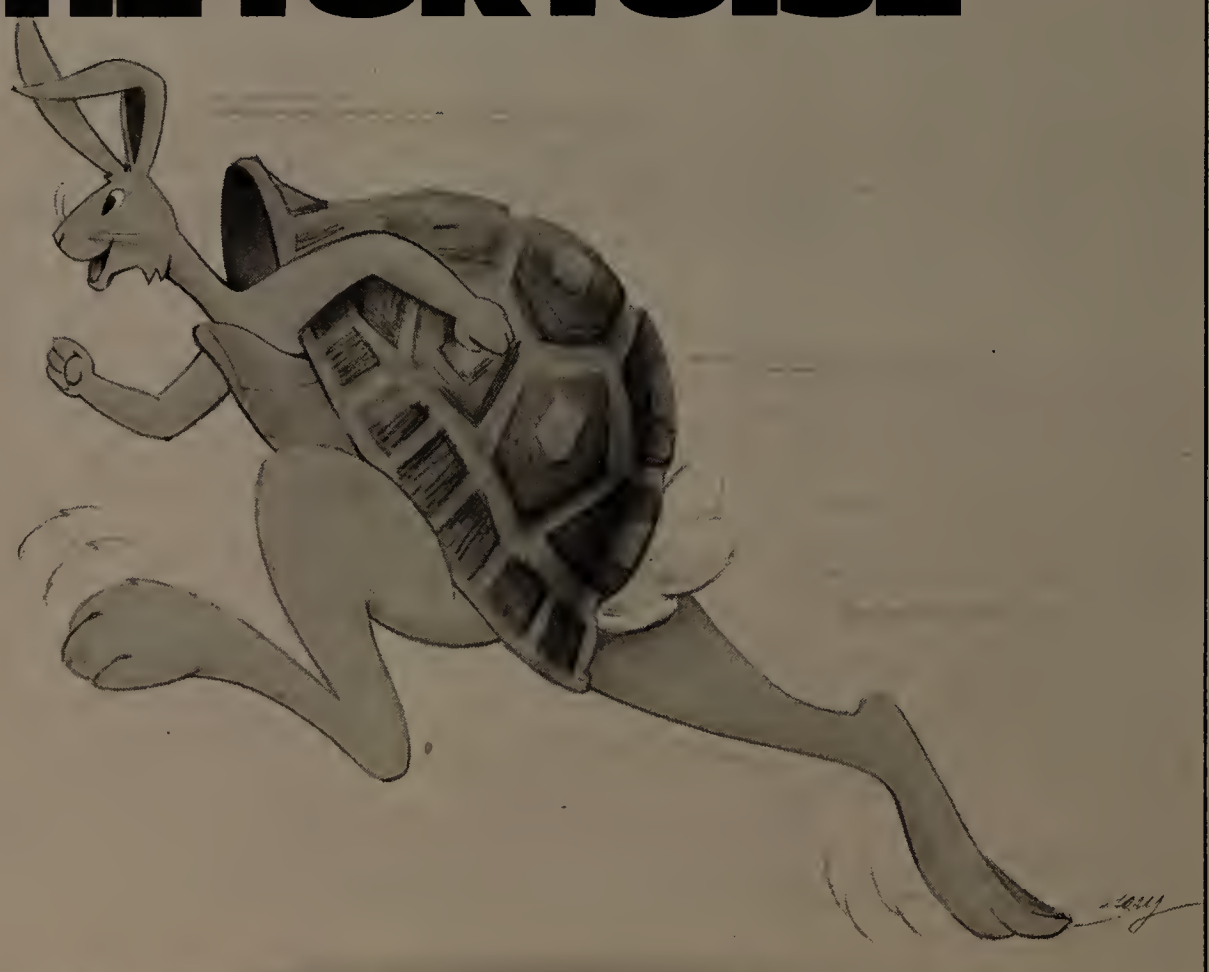
May 18-20, Chicago — **DP Operations Today: Effective Scheduling and Console Operation.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 18-20, Chicago — **Computer Performance Measurement and Capacity Planning: Tools and Techniques.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 19-20, San Francisco — **Local-Area Networks: Equipment and Systems.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

May 19-20, Chicago — **Data Administration: Development and Practice.** Contact: Barnett Data Sys-

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Calendar

tems, Inc., 19 Orchard Way N., Rockville, Md. 20854.

May 19-20, Boston — **IBM's Systems Network Architecture: A Master Plan for Teleprocessing.** Contact: Seminar Department, Datapro Research Department, 1805 Underwood Blvd., Delran, N.J. 08075.

May 19-22, Virginia Beach, Va. — **Virginia/Carolinas Computer Show & Office Equipment Exposition.** Contact: Linda Roth, Suite 1200, 1413 K St. N.W., Washington, D.C. 20005.

Week of May 22

May 22-24, St. Louis — **Dexpo East 83.** Contact: Expoconsul International, Inc., 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

May 22-24, San Francisco — **Making Connections: Conference on Local Area Networking.** Contact: Sommerset Group, Inc., Suite 300, 111 Anza Blvd., Burlingame, Calif. 94010.

May 22-25, Miami Beach, Fla. — **1983 National Operations and Automation Conference.** Contact: American Bankers Association, 1120 Connecticut Ave. N.W., Washington, D.C. 20036.

May 23-25, New York — **The Technology of Personnel.** Contact: Joni Gallagher, Human Resources Information Management Society, 3051 Adeline St., Berkeley, Calif. 94703.

May 23-25, Summit, N.J. — **Vsam in Cobol.** Contact: Chubb Advanced Training Center, 480 Morris Ave., Summit, N.J. 07901.

May 23-25, New York — **Financial Information Systems.** Contact: National Institute for Management Research Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

May 23-25, Houston — **Developing Automated Human Resource Management Systems.** Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

May 23-25, Washington, D.C. — **Managing Microcomputer Systems.** Contact: U.S. Professional Development Institute, Department A, 1805 Powder Mill Road, Silver Spring, Md. 20903.

May 23-25, Cary, N.C. — **SAS Processing Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N. C. 27511.

May 23-25, New York — **Establishing a Computer Security Program.** Contact: Computer Security Institute, Department ERC, 43 Boston Post Road, Northborough, Mass. 01532.

May 23-25, Chicago — **Computer Software Packages: Evaluation and Selection.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 23-25, Chicago — **Integrating Office Automation and DP Systems: Effective Strategies.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

May 23-27, New York — **CICS Command Level Programming.** Contact: Sysed, Inc., 1 Park Ave., New York, N.Y. 10016.

Graphics Meet Set for July 13

LOS ANGELES — A three-day conference on "Computer Graphics," sponsored by the National Institute for Management Research (NIMR), will be held here July 13-15.

The conference will focus on the practical applications, implementations and economic considerations of computer graphics technologies. The latest innovations and case studies will be examined from the DP, executive and engineering/manufacturing points of view, NIMR said.

The event costs $595 to attend. Additional information may be obtained from NIMR at P.O. Box 3727, Santa Monica, Calif. 90403.

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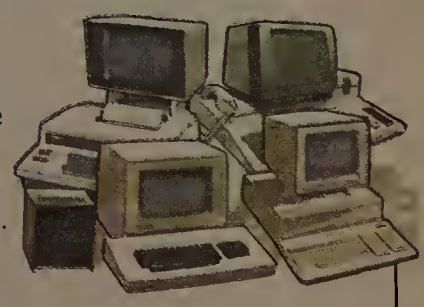
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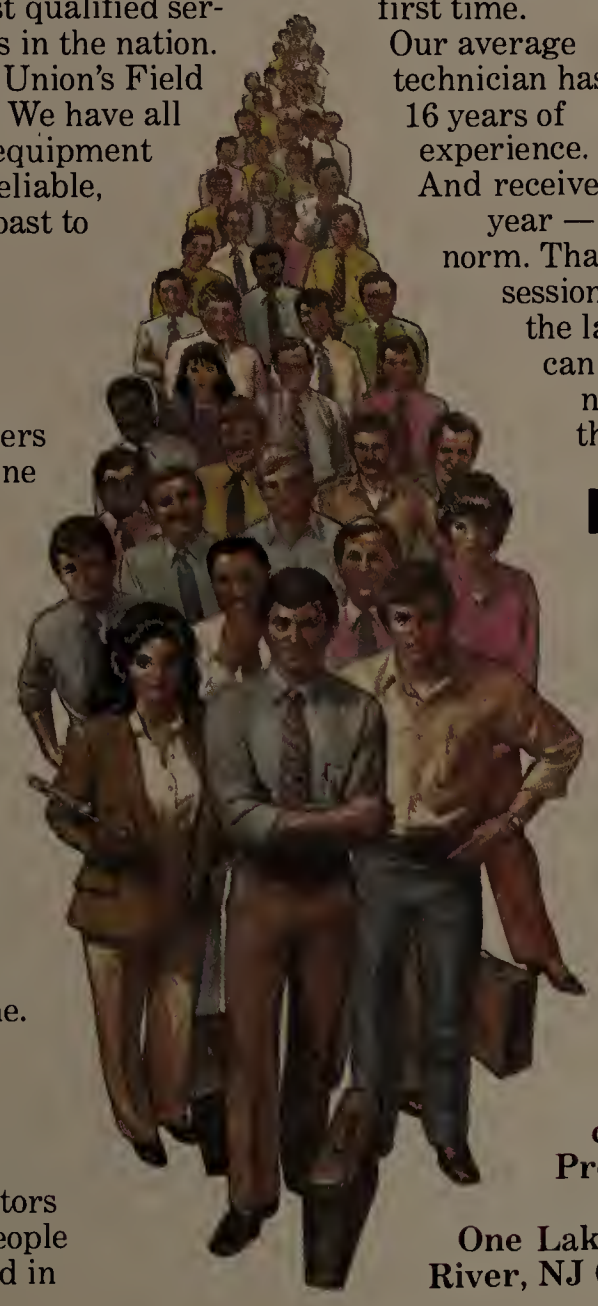
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CW Photo by M. Zientara
Franz Fauley

Set Goals Before Evaluating CAI: Exec

By Marguerite Zientara
CW Staff

BOSTON — Evaluation of computer-aided instruction (CAI) systems should begin with a written blueprint stating exactly what the organization hopes to get out of the system.

That was the advice of Franz Fauley, president of Computer-Based Education Systems in Hawthorne Woods, Ill., speaking at the Computer-Based Training Conference here recently.

"It is critical to have your goal firmly fixed in your mind before you begin the evaluation process or you'll be spinning your wheels," he warned, noting that it is "hard to put it into writing and easy to start without putting it in writing."

To be done before any courseware development or implementation, a blueprint should analyze various hardware configurations, various authoring software systems and the ease of use of potential authoring systems, he said.

Managers should also consider "author productivity" as it relates to a system, Fauley counseled. Furthermore, does the design strategy take advantage of the latest technology in CAI? And does the strategy include a follow-up program for going ahead with a permanent CAI system if an experimental installation is successful?

Phase II of CAI system evaluation involves a pilot installation and calls for the examination of five factors: trainee attitudes, efficiency and effectiveness, authoring languages, trainer attitudes and cost/benefit analysis. This phase takes "the greatest share of one's effort," Fauley said.

In studying trainee attitudes, the manager should attempt to ascertain whether instructional materials are reaching the required number of trainees "in a timely fashion," and how trainees feel about courseware accessibility.

Since the goal of CAI is to teach trainees the same amount of material in less time than it takes with traditional methods, tests of efficiency and effectiveness are crucial. These issues are usually measured through a comparison of pretest and post-test scores from both experimental and control group test subjects, he said.

In evaluating authoring systems, managers should compare several for the pilot test. Author productivity, ease of use, ease of learning the language and hardware compatibility or convertability should be examined.

Trainer attitudes is another area of major significance, Fauley stressed. Trainers should be prepared for the introduction of CAI and be involved in the planning process, he said.

In making a cost/benefit analysis of CAI, two things are needed to justify computer-based training, Fauley said. "If you can reduce travel costs and decrease learning time, then you have a good return on your investment." Most CAI systems result in a 30% improvement in learning time, he noted.

Phase III of the evaluation process focuses on the quality of the courseware and trainees' acceptance of it.



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Speaker Says CAI Evokes Both Exhilaration, Terror

By Marguerite Zientara
CW Staff

BOSTON — "In the field of computer-aided instruction (CAI), we walk a fine line between exhilaration and terror," according to Gloria Gery, president of Gery Associates consulting firm in West Hartford, Conn.

The exhilaration stems from the fact that CAI is booming, as witnessed by the unexpected crowds at last week's Computer-Based Training Conference here, sponsored by Boston-based *Data Training* newspaper.

At the same time, the CAI boom is a source of "terror," or at least apprehension, for many corporate trainers who are increasingly faced with ever-growing numbers of trainees, Gery explained.

Because today's workers — who seek personal growth and self-actualization and fear technological obsolescence — are making more strident demands for training, trainers are suddenly discovering the "power and practicality" of CAI, Gery said.

'One-to-One Learning'

The benefits of CAI programs are evident in Gery's definition of CAI: "A one-to-one interactive learning experience between student and computer in which the computer provides the majority of the instruction and feedback."

In her session, "Implementing CAI: Issues for Managers," however, Gery warned trainers not to regard CAI as the cure for all problems. "Every system has its limitations," she said. "Don't have unreasonable expectations, especially in relation to what you're willing to pay."

On the other hand, CAI can help alleviate many of the problems of traditional stand-up training methods, including availability vs. demand, timeliness, cost, scheduling, availability of human resources for training, course consistency, interactivity, students' lack of control over their training schedule and maintaining course currentness.

In evaluating whether to implement CAI in an organization, managers should consider both the "driving forces" that point toward CAI and the "restraining forces" that point away, Gery said.

Among the driving forces are the volume increases possible with CAI that bring costs down; the existence of communications nets that lend themselves to CAI; and the increasing diversity of students, calling for a variety of training approaches and travel and living costs for trainers, which reach "a thousand dollars a week, easily," Gery pointed out.

Restraining forces include visible and up-front expense and lack of knowledge at this early stage of CAI. "Very few people know good [CAI] course design," Gery said. "When you see it, learn from it," she suggested, citing as "elegant" Digital Equipment Corp.'s personal computer, Decmate II and Professional 350 computer training courses.

Other restraining forces are the lead time necessary to develop CAI courses, which can be several hundred hours per course; developing CAI for changing or incompatible hardware systems and corporate competition for computer time and resources, with training typically having the lowest priority.

Also of concern is the "very complex" issue of implementation politics, which involves power struggles over resources, getting the right people involved and the phenomenon that "no one wants to touch it until someone else does," Gery said.

Lastly, trainers who came from programming "vowing they would never write another line of code" may be dismayed to find that is exactly what they would have to do with CAI systems, she said.

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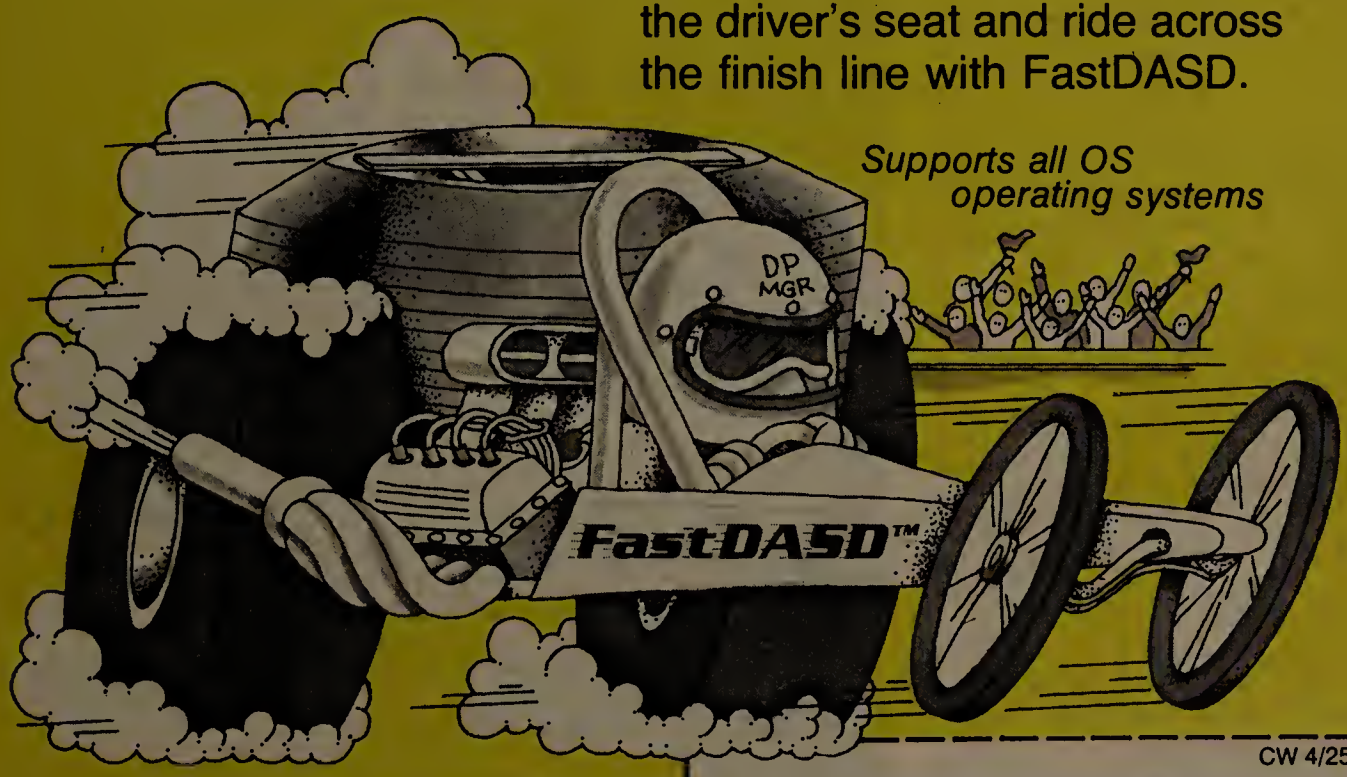
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Mainframe/Micro Contest in CBT Continues



Stephen Sankey

By Marguerite Zientara
CW Staff

BOSTON — Should a computer-based training (CBT) manager use mainframes or microcomputers as the system's computer resource?

There is no easy answer to that question, which depends on an organization's existing technology as well as the desired functions of a CBT system, according to Stephen Sankey, manager of computer-based training for Bank of America in San Francisco.

Speaking at the Computer-Based Training Conference sponsored by *Data Training* newspaper here recently, Sankey noted that the mainframe/micro controversy has been "bubbling at the Bank of America for several years and is still unresolved."

One of the major considerations in deciding which way to go is that of response time, which must be fast for CBT. Bank of America's standard for response time is under 1.5 seconds. Micros give the manager better control in that area and the ability to expand memory size, Sankey noted.

Also of major importance are cost issues. Micros are obviously cheaper than mainframes. But there could be hidden costs tied to the small machines such as a need for additional office space, Sankey pointed out.

In addition, with mainframes, there is the question of ownership. Because Bank of America's mainframes are financed by the DP department, "we depended on them for support and direction, resulting in a coordination problem," he said. Micros, on the other hand, can be owned by the training department.

If the manager purchases micros through DP, "make sure you have input into the choice of micros," Sankey advised. "Because the micro will be the delivery vehicle for training, it's good to be in on the ground floor of the acquisition process."

As for software costs, "there's no comparison between mainframe and micro software," Sankey noted. And while micro software offers "some remarkable deals," he noted, "there's more tested, working [computer-aided instruction] software for mainframes than for micros."

Software support is good in a mainframe environment, but uncertain with micro-based CBT software, Sankey said. "We could telephone [Apple Computer, Inc.], but it was hard to find someone who knew about their Pilot software," he noted. In addition, one should have business hours access to service.

Marketplace Volatility

A problem cited by an attendee was the volatility of the micro marketplace. "If you're too dependent on the software and the company goes down the tubes, you're stuck," he pointed out.

His solution was to arrange for the source code to be put in a safety deposit box, with an agreement that if anything happened to the company, he would have access to the source code.

In the area of facilities costs, "the less variety of equipment you have, the better," Sankey said. If you have "all kinds of terminals on the mainframe, it's very complicated to have software that can talk to all these." In a micro environment, try to make sure you have only one type of micro being installed, he suggested, acknowledging that it is "not easy to ensure."

CBT makes heavy use of software branching structures, which is time-consuming and uses lots of processing power, he noted. With micros, one must determine how fast you can bring data in off a disk.

A very important point for students is whether the system can keep the student's place without his starting over again at the beginning of a course after taking a break. Mainframes have the capability; micros do not.

Other factors that should be taken into account are whether you want color and/or sound; whether the system can do simulation of applications products, student tracking capabilities, updatability, flexibility for misspellings and variety in answers, reporting functions, potential scheduling problems and courseware availability.





'Please . . . Don't Point the Gun Towards the Computers.'

How Do Consultants Price Services?

Turnaround Time
By Larry E. Long

Q For the last 20 years I've been the director of increasingly larger DP shops. In my last position, I was responsible for an annual budget of over $14 million. At 50, I've decided that 20 years is enough and will become an independent consultant specializing in matters relating to DP personnel, planning and organization.

Do you have any guidelines that would help me price my services?

A Consulting fees in the area of information services vary from $200 to $1,500 per day depending on the consultant's education, credentials, experience and his proven ability to get the job done. A handful of information services consultants demand fees of $3,000 to $10,000 per day.

In pricing your services, you must maintain a delicate balance between a fee that is acceptable and a fee that is high enough to demand client respect. You could quote $1,000 per day and demand respect, but your credentials may not be convincing enough to land the job. It may take a little trial and error, but eventually your perceived worth and your actual worth will converge to a realistic fee.

Assuming that you've been a successful DP manager and can demonstrate your ability to get the job done, you might start at $500 per day. Add up to $200 per day extra if you feel your education and/or credentials are extraordinary. You can move up or down from there depending on the receptiveness of potential clients.

Q I am hungry to get a piece of the computer action, but I have just received an economics degree, and I cannot face up to further schooling financially or psychologically.

I have a fairly strong aptitude for computer programming and would like to find out if there are any companies that train people from scratch in DP.

A Five years ago, thousands of companies were more than willing to hire graduates of almost any discipline who demonstrated a willingness and aptitude to learn DP. Current economic circumstances have forced companies to look for more immediately applicable skills. The first choice of most companies is to recruit experienced personnel. Their alternate recruiting strategy is to pursue recent graduates with a solid base in information systems or computer science.

For experienced professionals, it's still a seller's market, but it's now a buyer's market for entry-level people. At the entry level, companies are demanding and getting graduates with a solid educational base in computers.

There is an outside chance that an aggressive job search may land you a DP position, but your best hope for a piece of the action is to further your education.

Q Regulation Y of the Federal Banking Regulations is supposed to limit computer activities of banks and bank holding companies to "services closely related to banking."

I work for a bank-owned service bureau, and we do a variety of services for many customers.

Applications include: accounts receivable, inventory control, address labeling, voter registration, local tax accounting, job costing and many more — none of which could be considered closely related to banking.

Are we within the limits of Regulation Y? If not, how long do you think the banking examiners will allow us to continue doing these kinds of jobs?

A Regulation Y is concerned with allowable nonbanking activities. The regulation limits data processing services to "financial, banking and economic data"; however, the banking industry has adopted a rather broad interpretation.

You might have a little trouble with address labeling and voter registration, but with a little imagination you could make a case that all your applications are within the limitations of Regulation Y.

Hundreds of other bank-owned service bureaus have interpreted Regulation Y in a similar manner. Since this interpretation is widely accepted, I would be surprised if you and the others were not permitted to continue the present mode of operation indefinitely.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, *P.O. Box 880, Framingham, Mass. 01701.*



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Digital Engineering graphics enhancements for more than 200 on-site DEC VT100 alphanumerics terminals solved the graphics problems for nuclear scientists at the Los Alamos National Laboratory in New Mexico.

Graphics Boosting of Terminals Erases Researchers' User Logjam

LOS ALAMOS, N.M. — Waiting lines in front of graphics terminals have disappeared for researchers at the Los Alamos National Laboratory here.

With four Cray Research, Inc. supercomputers in its hardware arsenal, scientists working here had abundant computing power. But each graphics terminal was shared by several users until recently, when the lab enhanced 200 of its standard alphanumeric terminals with graphics capabilities.

Before the enhancements, "a lot of time was spent waiting for terminal availability," said John Blaylock, a staff member of the Computational Physics Group and member of the laboratory committee charged with solving the graphics problem. "What we needed was moderate graphics resolution to enable us to provide terminals to every user requiring graphics capabilities."

Los Alamos National Laboratory conducts research and development for the U.S. Department of Energy in areas of national security and advanced energy technology. The laboratory is one of eight federally funded labs bringing multidisciplinary skills to bear upon problems of national scope.

Vast Net Required

Because of the size and nature of the laboratory and the complexity of its programs, a vast computer network is required to compute, store, track and manipulate data. Eleven mainframe computers (including four Cray-1 supercomputers), several hundred minicomputers and a host of microcomputers take care of the lab's processing needs. These computers communicate with each other and with their users through the Integrated Computing Network, designed and developed by the lab's computer division.

With the addition of Digital Engineering, Inc.'s 640 by 480 resolution VT640 Retro-Graphics board into 200 Digital Equipment Corp. VT100 terminals, data stored in the computing system can be graphically manipulated in a more cost-effective manner, a Los Alamos spokesman said, and the waiting lines for a graphics terminal have ended.

A major use of the terminals is to display graphically complex geometries of models such as the burning of fuel in a thermonuclear reactor. "There are literally thousands of parameters and billions of computations necessary to simulate a reactor or particle accelerator or a containment building," Blaylock said.

"Once all of the parameters regarding dimensions, materials, properties of materials and other factors have been entered, the first question is 'Do all these numbers accurately represent the object being modeled?' " Blaylock continued. "One way to explore the question is with a graphics display. If it looks like the object you are modeling, then you know the model is fairly accurate."

Graphics can also help spot design flaws. For example, if a particular component is in the wrong place, or of improper dimension, it can be seen immediately on the terminal screen. "You could look at columns of figures all day long and still not see it," Blaylock said. "With the new capabilities, a model can now be run, stopped when an inconsistency is spotted and then continued after the problem has been corrected."

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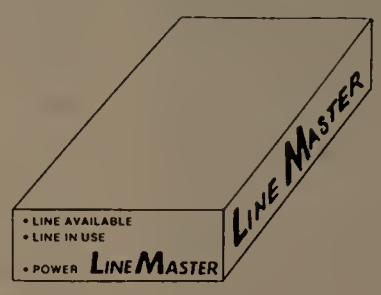
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Casino Tracks Personnel With HRMS System

ATLANTIC CITY, N.J. — At the beginning of the summer of '79, Resorts International, Inc. had more than 5,000 employees, a number that more than doubled within two and a half years.

At that point, "we knew that we had to have a gigantic computerized payroll and personnel system," noted Bob Gensamer, assistant corporate controller.

A telephone call from Gensamer to the Resorts International DP manager in Miami produced a proposal from Wang Laboratories, Inc. for a Human Resource Management System (HRMS). The company decided to purchase the Wang system because other systems "simply didn't have as much flexibility" as the Wang system.

HRMS is being run on two compact Wang VS computers with three 288M-byte disk drives, tape drive, a 600-line/min printer and 32 CRT terminals. Three terminals are located in the payroll department and one is situated in each of the casino's personnel, development and data processing departments.

"We have put 47 different earnings types into our system," Gensamer said. "This large number is a direct result of the many unions involved and the several unique facets of the union contracts."

Currently, 26 different payroll deductions reside on the VS.

A skills bank — or inventory of each staff member's training, education and experience — is an integral part of VS/HRMS. "If we are searching for a technician with training in computers," Gensamer said, "it may be that some of our own employees have completed a course at a community college or at a business school."

Casino Control Commission requirements also include the licensing of employees working in the restaurant, hotel, casino complex.

"It is important that we maintain follow-up on these licenses and their renewals, as well as in the work permits of all employees," Gensamer explained. "The VS is also helping in this area."

Unique Requirements

The casino industry carries "unique report-writing requirements," Gensamer noted. "We've taken people with no DP training whatsoever, and with a little instruction they were writing their own reports."

Other system applications include seniority lists per department and staffing reports. "The staffing reports are more than a weekly summary of needs," Gensamer pointed out. "They are effectively a census report of every department, describing the present strength of each, projected allocations and areas of shortages or overstaffing.

"Printouts can be generated by shift or by a variety of other descriptors. These printouts really provide you with a complete analytical report from which to make important, timely decisions."

By-products of VS/HRMS include a car-pooling system for matching riders, drivers and shifts. And the Wang VS word processing option is used in credit collection and casino control regulation violation reporting.

Gensamer said the company is planning to expand to a VS100 in order to add another 100 terminals to the system.



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EDITORIAL

Striking Back

Three unusual things happened in Florida and Connecticut recently — three things that should always happen when a company falls victim to a computer crime but usually do not.

Connecticut General Insurance Co. lost $206,000 to Diane Smith Torres, a benefits analyst at the company's Miami office. Torres had figured out a way to use her remote terminal to produce 42 false claims and to have the benefit checks sent to her and members of her family.

When Connecticut General's internal investigation departments discovered the fraud, they went directly to Dade County officials. Unlike many companies that believe it is unwise to open themselves to adverse publicity, Connecticut General had the courage to come forth with its discovery.

Then a second unusual thing happened. Florida prosecutor Jim Falco decided to prosecute Torres under Florida's computer crime law. Unlike many prosecutors, Falco did not shy away from the specifically designed law for fear of a test case or from a general apathy for computer crime. Although this law has been on the Florida books for five years, this was to be only the second conviction under the statute.

Finally, the most unusual thing happened. When Falco needed help understanding the technical aspects of the case and when he wanted expert witnesses to explain to a jury how the crime was committed, Connecticut General and its parent company, Cigna Corp., assembled between 10 and 20 experts selected from the data processing department, internal investigation departments and the Miami field office.

When Falco appeared in court, armed with a specific computer crime law and expert witnesses, Torres changed her plea from innocent to guilty. Like many computer criminals, Torres had hoped the state would not go to trial and, if it did, she had hoped to be found innocent when the jury could not understand the case.

Connecticut General set an example for its peers by making expert witnesses available. And Falco set an example for state prosecutors around the country when he accepted help from Connecticut General and used the statute he had at his disposal. Torres could receive 35 years in prison for her attempt to defraud her employer when she is sentenced in May.

If companies and prosecutors everywhere worked together in this way and used the current crime laws, the conviction and subsequent deterring of computer criminals might not be such an unusual thing.

DATA PAST

Five Years Ago
April 24, 1978

WASHINGTON, D.C. — The Board of Governors of the Federal Reserve System announced plans to create a nationwide network for making payments electronically rather than by check — despite opposition from the Justice Department.

— — —

BOSTON — A Honeywell Information Systems, Inc. minicomputer is credited with recording the finishes of 5,492 runners in the 82nd Boston Marathon, won by Bill Rodgers.

Ten Years Ago
April 25, 1973

TULSA, Okla. — Telex, relying almost soley on previously secret IBM documents to prove that IBM is a monopoly, began its $1.2 billion antitrust case against IBM.

— — —

NEW YORK — City officials credit a record-breaking welfare roll decline of 17,292 cases in the month of February to tighter management and computerization.

It was the fifth consecutive month in which the number of people on the rolls dropped.



'No Sale. The Competition Might Find Out We Need Your Services.'

LETTERS

Assuring a Healthy Future

Since *Computerworld* has not made a practice of tracking Vector Graphic, Inc.'s success during the past seven years, I was surprised to see "Vector Graphic Cuts Back to Counter Quarter Losses" [CW, April 11]. Unfortunately, you are apparently relying on external information sources. These sources appear to know very little about Vector Graphic, having never visited us. I would like to set the record straight.

You were correct when you discussed the meteoric rise of our company, and you were also right about our loss and layoffs last quarter. Our management has changed, product introductions were delayed and competition has increased.

However, despite all the dismal-sounding news, Vector Graphic is still in a very strong position. We have a very loyal dealer network, as evidenced both by the fact that 90% of the dealers participated in our recent nationwide teleconference and by the dealers' enthusiastic acceptance of Vector Graphic's new Linc local-area network that was introduced at that time.

Contrary to the assertion made by Portia Isaacson from Future Computing, Inc., Vector Graphic has not lost its management direction. Rather, we have been redefining and clarifying our marketing strategies, making those management changes that will help us achieve our goals and strengthen rather than weaken the company. To consolidate our product offerings and become more "niche-oriented," as Isaacson suggests, requires a management team that can direct the development and marketing of products that meet those strategic objectives.

The successful introduction of Linc and the continuing stream of new hardware and software products being released to our dealers are due to the efforts of a first-rate management team that will provide the strong leadership that Vector Graphic needs as it continues to grow.

Our excellent distribution network, strong product set and our ability to respond quickly to changes in the marketplace and the economy, together with our good relationships with our banks, assure a healthy future for Vector Graphic.

After all, we helped build this industry, showing the way to many others. A little bit of bad weather is not going to sink this ship.

Lore Harp
Chairman
Vector Graphic, Inc.
Thousand Oaks, Calif.

The Real Problem

The article "Data Encryption Packages: Why Aren't They Hot Sellers?" [CW, April 11] provides a very useful compilation of key data about software encryption packages. Oddly, though, it fails to answer correctly the question posed in the title.

The reason why encryption software and hardware are not selling is that those who might buy them realize that the packages do not provide solutions to major data security problems. Encryption is a good solution to problems that only a few people have. There is simply no reason to solve problems we might have until we solve those we do have.

Clerks and administrative and operational people misusing resources extended to them for the performance of their normal jobs make up an overwhelming majority of our security problems. We must address these problems first.

Robert H. Courtney Jr.
President
Robert Courtney, Inc.
Port Ewen, N.Y.

SOFTLINE /Werner L. Frank‡

The Improving Cost-Effectiveness of Software

We are all well aware of the continuing tremendous improvement in the cost-effectiveness of hardware. Disk storage has had a hundredfold unit price improvement in the past 20 years, while main-memory prices per 1M byte have improved several hundred times in that same period. Indeed, there is a common belief that hardware has been improving two decimal orders of magnitude every 10 years for the past three decades and promises to continue to achieve such results in the foreseeable future.

To emphasize the point concerning improvements in computer hardware development, recall the often-used analogy concerning the automobile industry. If progress in the automobile industry had kept pace with the degree of improvement in the computer industry for the past 30 years, an automobile today would be available at a price under $100, would be capable of traversing the U.S. on a gallon of gas and would be the size of a book.

But is software that far behind? Is the conventional wisdom that software improvements have been negligible correct? Is software really not able to match hardware improvements and increases in hardware cost-effectiveness?

Analysis of Cost-Effectiveness

I would like to challenge this point and introduce through an example an analysis of cost-effectiveness improvement over a period of time for a given software system.

The Mark IV system from Informatics General Corp. has been in existence for 15 years. This software was originally offered on the marketplace in 1968. As can be seen from the box above, the product was initially developed on an investment of $1 million, was offered for the popular IBM 360 computer line and sold on a perpetual-license basis at $30,000. At the beginning, no maintenance fees were stated. Instead, support was promised for a period of one year after negotiation of the license agreement.

Turning to the data associated with 1982, it can be seen that another $18 million of development dollars were invested in the product, which continued to serve the family of IBM-compatible computers that are descendants of the original 360 line.

The significant changes in features and capabilities of the system are indicated by increases in the number of lines of code by a factor of 1,000, more pages of documentation by an order of magnitude and the number of installation parameters and diagnostic messages by a significant amount. All in all, the product has become more encompassing, handling more complex data structures and supporting many more operating environments. We estimate this increase of capacity, performance and functionality in 1982 as a factor of 15 over that existing in 1968.

Of perhaps even more significance is the stability of the nonprocedural syntax that defines applications to the system. This syntax has evolved with complete upward compatibility during the course of all these years so that programs developed in 1968 can still operate today on any one of the IBM mainframe or compatible computers, including all varieties of environments associated with such hardware. Such portability, formerly unknown in the industry, bridges not only hardware changes, but also changes in operating systems, access techniques, data files and data bases.

Fifteen Years of Mark IV

CAPABILITY/FEATURES	1968	1982
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Revenues	$2 million	$150 million
Installations	50	1,950
Releases	1	27
Development Dollars	$1 million	$19 million
Training Classes		3,200
People Trained		26,000
Base Price:		
Minimum System	None	$15,000
Top-of-Line System	$30,000	$98,000
Count or Number:		
Models	1	9
Operating System Environments	2	6
Options/Special Features	1	34
Lines of Code	25,000	2,500,000
Program Modules	72	875
Overlays	8	101
Pages Documentation	200	2,300
Diagnostic Messages	284	2,192
Training Courses	5	10
Installation Parameters	1	60
Typical Host Computer	IBM 360/40	IBM 3033
Minimum Host Computer	IBM 360/25	IBM 4331
Maintenance Fee	None	7% to 12% per year

Cost Remained Level

What about the cost-effectiveness measure for this software? As can be noted from the box, the price increase for the top-of-the-line system over this 15-year period has been over 200%. Coincidentally, during that same time frame, the U.S. inflation rate has been essentially the same amount. Hence, measuring the product price in real terms, the cost to the client has remained level.

But look how much more the client is getting today for the same real dollar. Even more important, look at the realized benefits older clients achieved with respect to their initial investments.

The improvement in the Mark IV system over this period is at least a factor of 15. This can be seen by noting the various ratios of parameters shown in the box. In view of the offsetting of the price increases by the inflation factor, the factor of 15 represents the cost-effectiveness measure that has been achieved over the years by the Mark IV system.

While this factor of 15 appears small beside the two orders of magnitude represented by hardware improvements, nevertheless, it is quite impressive when compared with the common belief that software improvements have been minuscule over the last few decades.

Frank is an independent consultant and president of the Werner Frank Computer Group located in Calabasas, Calif.

HUMAN CONNECTION /Jack Stone‡

When a DP-Generated Form Loses Its Way

There exists today a wretched electronics to-do called the District of Columbia Government Computer Center, which was in chaos 11 years ago when I did a little teaching there and has been collapsing ever since.

So when the deadline approached for this year's auto registration and I awoke one day to the realization that my computer-generated renewal form had not yet arrived, I found myself consumed with dread over the prospect of having to stand in line for tags at the Washington, D.C., Municipal Building. Unluckily, I possessed an unpaid parking ticket and the computers won't issue new plates without a resolution of such malfeasances.

The adventure started off reasonably well when I noted that an information counter had been installed since I last visited which, for Washington, was quite an innovation. I was directed to a long queue (to keep track, I'll call it No. 1), which snaked along the corridor to a doorway with a partly illegible sign referring to renewal forms. Queue No. 1 seemed logical enough, except that after patiently moving up the line, I was advised — by a person coming out into the hallway and yelling to the crowd — that I was in the wrong line if I had any outstanding tickets.

Happily, the next queue — No. 2 — for paying tickets, was short, but I couldn't understand why it took anywhere from five to 15 minutes for those ahead of me to pay off their traffic misdemeanors. At any rate, the knowledge that I was in the right line tended to retard the ulcers that were rapidly growing. After meekly confessing my guilt and begging forgiveness for my crime, I was told that the computer had no record of the ticket, and I was cleared and told to return to No. 1.

Death of a System

After inching my way along the corridor for what seemed to be hours, humming some tunes from the '40s to keep myself occupied, I reached the window at No. #1 and delivered my expiring registration card to the terminal operator, whereupon the computer system died.

A supervisor leaned out the window and shouted, "The *$"#!•#+@ computer is down! It's gonna be awhile!" For some reason, I was serene, my mind was clear and my stomach quiescent. Perhaps it was because I knew in my heart that I had done my best, even though it wasn't good enough.

But my feelings gave way to anxiety when I saw the entire cadre of terminal operators gathering their belongings and moving out to the snack bar for their afternoon break.

System Restored

Surprisingly, some benevolent force must have been with me, because in a short period of time, the system was restored, the operators raced back to man their machines and my renewal form was generated. That was the good news. The bad news was that I had to go to another office to pay the fee.

The new office did not seem too badly organized, at least at first glance. There were three lines at three windows, identified hereinafter as No. 3, No. 4 and No. 5. There were no signs on the windows, but since they resembled cashiers' cages, I felt safe in assuming I was on the right track. I started with No. 5, as it was the shortest. But when my turn came up, I was redirected to "one of the other windows," without further explanation. So I chose No. 4, in part because it was more scenic.

When I pushed my form under the grille, I was told I would have to be cleared first in another queue — No. 3. After arriving at No. 3, I was pleased when the clerk took my form. Then I was very unhappy when she kept it and told me to go to No. 4 for further processing. I was positively miserable when the clerk from No. 4 sent me on to pay my bill at No. 5.

Would only the auto registration renewal form for the director of data processing for Washington, D.C., get lost in the mail.

Letters to Stone should be addressed to him at Box 270, 1377 K St. N.W., Washington, D.C. 20005.

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GETTING AHEAD IN DP/Donald J. Berardo‡

How to Increase Your Upward Mobility

Merit increases . . . promotions . . . added responsibilities — these make up the stuff of which career advancements are made. Many people assume that being technically proficient is the sole criterion for career growth. They assume the attitude: "I'll just do my technical thing, and the rest will follow."

But while technical competence is essential for you to do your job, it may not be enough to help you ascend the corporate ladder. DP departments can become highly structured, politically biased organizations.

With many deadline-oriented projects going on at once, priorities come into conflict. Department staffs can split into warring factions, and the jobs themselves become juggled in a game for power. How you deal with this aspect of the competitive DP environment can have a direct effect on your potential career growth.

When you were hired the personnel department and your boss were sizing you up for more than just your technical abilities. They also wanted to know just how well you would fit in. You continue to be appraised by such standards, and your sensitivity to these measures can help you manage your career development.

How Well Do You Fit In?

Just how well do you fit in? How do you stack up against your competition? To clarify your understanding, you must first follow the proverb, "Know Thyself."

You should begin by looking at yourself from two perspectives: how you see yourself and how others see you. This mirror image will reveal much about your political, as well as personal, position.

You should examine two sides: your technical skills and your personal traits. Seeing the whole picture is critical. Our data shows that each time you ignore this model, you run the risk of losing at least 50% of your power at work.

Ask yourself:

- How strong are my software skills, systems abilities or design capabilities?
- Am I as strong technically as I should be?

Make a list of your colleagues who could be regarded either as competitors or as team members. Where do you rank among them for speed? Production competence? Timely project completion? Overall track record?

Rank the others on your diagram. Are you near or at the top? Do you need to improve your standing? If so, who could be a mentor — a teacher/ally — in your technical development? Remember that your superiors look at how well you learn to apply new techniques as they weigh your career growth.

Subjective Labels

Next, see yourself as your colleagues do — with subjective labels for your social behavior. Are you thought of as a hard worker? A fast tracker? A dunderhead? A likable person? An up-and-coming executive? A sex symbol?

Everyday opinions like these filter into your performance appraisal. Look into the mirror and list the five most important personal traits you possess. Consider these traits in starting your own file: likable, attractive, fast, slow, intelligent, physically fit, group-minded, loner, fat, thin, political, apolitical, honest and manipulative.

Ask yourself what your most obvious actions each day are. Don't go overboard. Stick to the most recognizable actions, including weaknesses. Eventually, you should set up an assessment chart that should help you measure your standing among your peers and in the eyes of your supervisors.

There are three valuable results for you to achieve by repeatedly using your chart:

- To describe yourself in a method of self-appraisal.
- To provide an ongoing tool for appraising your technical skills.
- To make you aware both of the strengths you should refine to your advantage and of the weaknesses you should strive to eliminate.

You'll reference this frequently as you explore the different facets of your career development.

Berardo is a management counselor and career therapist. He is vice-president with the Meld Group in West Hartford, Conn., publishers of a monthly newsletter on management development.



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READER COMMENTARY

Are You Preparing to Meet the Auditing Staff?

You knew that it was bound to happen: You just received word that the auditor will be arriving soon to review your new automated accounting system. We may not be able to save you headaches and heartaches with your current system review, but with a little effort on your part in the design of your next system, we can help to make your future reviews easier.

When preparing to meet the auditing staff, forewarned is forearmed. The auditor will be looking for a written trail that will allow an individual transaction to be traced from creation through processing to its eventual effect on the financial statements. The auditor will also want to duplicate the flow in reverse and will expect to be able to trace the same transactions backward from their final resting place in the financial statements to their origin.

In the past, when an accounting system was audited, the review was performed around the computer. This meant that if the information input to the computer was accurately reflected in the reports produced by the computer, the auditor assumed that the computer's internal processing was correct. This passive acceptance of the computer's processing is quickly becoming a thing of the past. Often, DP auditors are performing their audit reviews through the computer. This means that as well as checking I/O controls, auditors are also verifying the internal processing functions of the computer.

Available Techniques

There are many checks and verification techniques that are available to prove to an auditor's satisfaction that your system is processing accurately. As DP professionals, you and your staff must be able to meet the auditor's increased demand for information by documenting and explaining the processing controls supported by the system. Therefore, when designing a new system or making modifications to an existing one, the analyst should be aware of what controls the DP auditor will require.

Controls are more effective and efficiently programmed if they are built into your system at design time. Each step in the processing scheme must be capable of both being isolated and having its own unique controls reviewed.

Controls are procedures intended to minimize the risk of errors in processing. DP audit controls are divided into two broad categories: general and application.

General controls are guidelines that direct the flow of both internal and external processing. Since general controls are not application specific, they are not under the direction of a systems analyst.

Application controls are concerned with the accuracy and completeness of data. They have the most direct impact on systems design and the systems analyst. Such controls are broken down into three categories: input, processing and output.

Automated systems generally fall into two broad categories: batch or on-line. On-line systems, by their very nature, can obscure the audit trail that is of interest in the system review. Data is frequently transmitted from one program to another without a hard-copy listing being generated. On-line terminal sites are essentially remote operational centers and lack the security that would be present in a controlled DP environment.

On-line systems should conform to all of the checks that are required of a batch system. However, additional controls should be imposed on on-line systems to offset their potential weaknesses.

Input controls are designed to provide reasonable assurance that the information received for processing by the computer has been properly authorized and converted into machine-readable form. They are intended to ensure that data has not been lost, suppressed, added, duplicated or otherwise improperly changed. Input controls include checks that relate to the rejection, correction and resubmission of data that was initially in error. The correction of a file is more complicated than the prevention of the original error. Input controls are designed to stop errors before they happen. To meet these objectives, the following techniques could be used:

- Numeric reference numbers containing some scheme of check digits or a combination of a numeric key and the first few characters of an alphabetic reference can be used to verify a critical key field.
- Input record counts should be verified by comparing a manual tally to the computer-generated count.
- Batch totals should include control and hash totals. Batches should be numbered and the system instructed to flag any omissions in the quantity or sequence of batches submitted for processing.

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Build Controls Into System at Time of Design

● Transactions can also be sequence numbered and checked for omissions.

● The absence of required transactions can be flagged or warning messages can be generated when expected transactions are missing.

● Fields can be checked for numeric or alphabetic data as required.

● All errors should be listed on hard-copy exception logs.

● Fields that have a limited number of correct values, such as state abbreviations, should be verified with table files.

● The existence of one bad transaction in a batch should invalidate the entire batch. A batch is either right or wrong.

● Terminal controls are concerned with the accurate transmission of data, data base security and proper terminal usage. Message indicators can be used to verify the proper passage of data. (This is a control for on-line systems only.)

● Passwords and hierarchy codes are used for data base security.

Processing controls are designed to provide reasonable assurance that data processing has been performed as intended for the particular application, that all transactions are processed as authorized, that no transactions are omitted and that no unauthorized transactions are added. Processing controls duplicate the checks that existed in the manual systems. Some techniques include:

● Run-to-run totals should be balanced by comparing the sum of input master file totals plus this cycle's input to the values on the updated output master files. Totals to verify should include record counts and dollar fields.

● Programs should be capable of checking file identifications, including dates, version numbers, sequence numbers and internal labels.

● Reasonableness checks should include comparisons to a limit, or to a range of values, tests for proper mathematical sign and tests for zero value.

● The creation of backup files should be performed prior to critical system processing and file updating.

● Errors should be resubmitted for correction at the original point of entry.

● Where possible, the system should produce its own input either in the form of turnaround documents or data files passed from one segment of the system to another.

● End-of-run figures should be produced to allow for run-to-run verification of totals.

● Completeness tests make certain that all necessary fields have been entered for a particular transaction before accepting that transaction for processing.

● A closed-loop verification test sends specific data back to the originating terminal for visual review. For example, after entering a customer number, the customer name may be displayed on the screen. (This is for on-line systems only.)

● Memory protection should be used to stop multiple programs from updating the same data area simultaneously. (This is for on-line systems only.)

Output controls include processing that happens after the electronic manipulations are completed. Although output controls concern the operations or control departments more than the systems design staff, the final disposition of the system outputs must be considered when the system design takes place. Specific considerations include:

● In the case of sensitive reports, the number of copies generated should be no greater than those actually needed by authorized personnel.

● The output media must be established; standard stock paper, custom forms and computer-output microfiche are only a few of the possible options.

● Security must be kept in mind when printing system statistics. Sensitive information should not be used for balancing purposes unless it is adequately disguised. While the total fixed salary dollars of upper management might make a good I/O control figure, the analysts who use those dollars for balancing purposes might soon find themselves designing systems less sensitive and probably less interesting.

● Sensitive information should not be accessible to the terminal screen. (This is for on-line systems only.)

You must use caution when selecting the controls to use in your system. By instituting too many checks, your system can become control-bound and lose its flexibility. Common sense tempered with a bit of skepticism will serve you well in selecting the proper mix of checks in your system.

Haraf is administrator of marketing support at Orbis, Inc., a DP service bureau in Pawtucket, R.I., and Lamprey is a manager at Daly and Wolcott, Inc. in Warwick, R.I.

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READER COMMENTARY / Douglas R. Bybee‡

Take Two Chips and Call Me in the Morning

To every lawyer I have ever harassed at parties in search of free legal advice, I apologize. To every physician from whom I have ever petitioned a diagnosis, I apologize. To everyone of every profession who has been subjected to persistant seekers of gratuitous counsel, I sympathize. Now it is my turn.

Since the advent of the affordable personal computer, we DPers have been ill privileged to join the ranks of those expected to dispense never-ending advice, instructions and admonitions in exchange for a handshake and a pat on the back. Contrary to popular opinion, DPers are generally gregarious, sociable and on rare occasion, even Rabelaisian creatures. We like to be liked and we like to help people, but in my case, enough was enough!

It seemed to me that the traditional salutation "Hello, how have you been?" had lost its place to "Hello, I'm thinking of buying a computer and . . ." In this past year, I have been reacquainted with nine third cousins, four old college buddies, my high school French teacher and my great-aunt Harriet from Philadelphia — all, interestingly enough, in the market for computers.

I spent uncounted Saturdays, holding the hands of near strangers through supermarkets that sell computers, music stores that sell computers and drugstores that sell computers. I corrected what seemed to be hundreds of Basic programs for precocious six year olds and was called more than once at very odd hours to "fix a program that's acting funny."

For awhile, it was not too bad. I was sustained by the assimilation of new information. Before I started helping others through the personal computer labyrinth, I honestly did not know that Curt's Live Bait Shop was soon to market its own computer. Nonetheless, I wanted out.

I did not have the inclination to continue the adventure. For one thing, I made my living doing similar analyses, and for another thing, I wanted to maintain the few friends I had left. (The computer I recommended to my bridge partner "didn't work right" and the software package I recommended to the only racket ball player I could beat, now costs $150 less.) Also, I like to spend my Saturdays at Bohan's Bar and Grill.

Some Pointers

On first thought, I could see no discriminating escape from my penance. On second thought, I realized that others had weaseled out of giving me free advice for years. The trick was simply to turn their own well-honed gambits against them. To date, I can offer the following colloquialisms — they all work:

- To doctors: "Sorry, my specialty is broadband fiber-optic communications, but I would be happy to recommend a good friend who specializes in personal computers.
- To accountants: "I'd be happy to help you. Why don't you bring the records of all your information needs for the past four years, arranged in alphabetical-within-chronological order, over to my house on Saturday morning."
- To stockbrokers: "No problem! I'd recommend an XYZ Mod-12, but I heard a rumor at a convention last week that ABC, Inc. is soon to release a new rubber model that could revolutionize the business."
- To bankers: "This personal computer boom is really something, isn't it? It continues to amaze me that the computing capacity and speed we're paying $10 for today, cost $1,000 just a few short years ago; and they say even more dramatic cost/capability leaps are quite near."
- To insurance salesmen (never wait for a salesman to ask; always be the aggressor): "Charlie, I just saw you sitting here and I started thinking about your children. Think for a minute. What if something should happen to you? Pray to God it doesn't, but your children might have to grow up without a proper computer education. A bunch of computer guys have recently developed this plan . . ."
- To attorneys: "I charge $50 an hour." (You can never be coy with attorneys.)
- To mechanics: "How would it be if I drive over to your place on Saturday and we'll see what we can do, that is if my car can make it. I get this clank sound whenever I accelerate and . . ."
- To Aunt Harriet: "Aunt Harriet, did you know that there's more and more evidence that cats are allergic to personal computers?"

Bybee is an operating partner at Downstate Media, Inc., located in Springfield, Ill.

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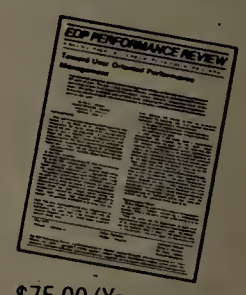
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LICENSING LAWS MAY GET TOUGHER

By David A. Wormser

If you send or want to send computer equipment, software or services outside the U.S., be aware that the rules of the game — and perhaps the referee — may soon change. Transfers of goods and technology, including transfers by users between two or more branches of a single company, may be affected.

The Export Administration Act (EAA) of 1979, which authorizes the export licensing system currently run by the U.S. Department of Commerce, expires on Sept. 30. Several legislative proposals to replace the EAA reflect the concern felt by some members of Congress that the U.S. compromises its national defense by exporting high-technology goods and technical data.

Legislation that would revise the current export administration system should be of great concern to any high-technology company doing business — or wishing to do business — internationally. Congress must act relatively quickly if export controls are to be maintained after Sept. 30. It is alarming that most of the proposals currently on the table would make it harder for American companies to operate in overseas markets.

This article discusses the EAA, the Commerce Department regulations that implement it and bills introduced to date to replace it.

The EAA was intended "to provide authority to regulate exports, to improve

IN DEPTH

the efficiency of export regulation and to minimize interference with the ability to engage in commerce." It sets up a comprehensive system under which the Department of Commerce controls the export of goods and technical data.

The EAA empowers Commerce to impose export controls for the following reasons: to protect U.S. national security, to further U.S. foreign policy goals and to curtail the export of goods in short supply in the U.S. The act also prohibits participation in foreign boycotts against countries with which the U.S. has friendly relations. Short supply controls have little application to exports of computer services, the foreign boycott provisions have had little application thus far, and neither would be changed significantly by any of the pending legislation; therefore, neither is discussed in this article.

Section 5 of the EAA authorizes Commerce to impose export controls on items affecting national security. The goal of the controls is "to restrict the export of goods and technology which would make a significant contribution to the military potential of any other country or combination of countries which would prove detrimental to the national security of the United States."

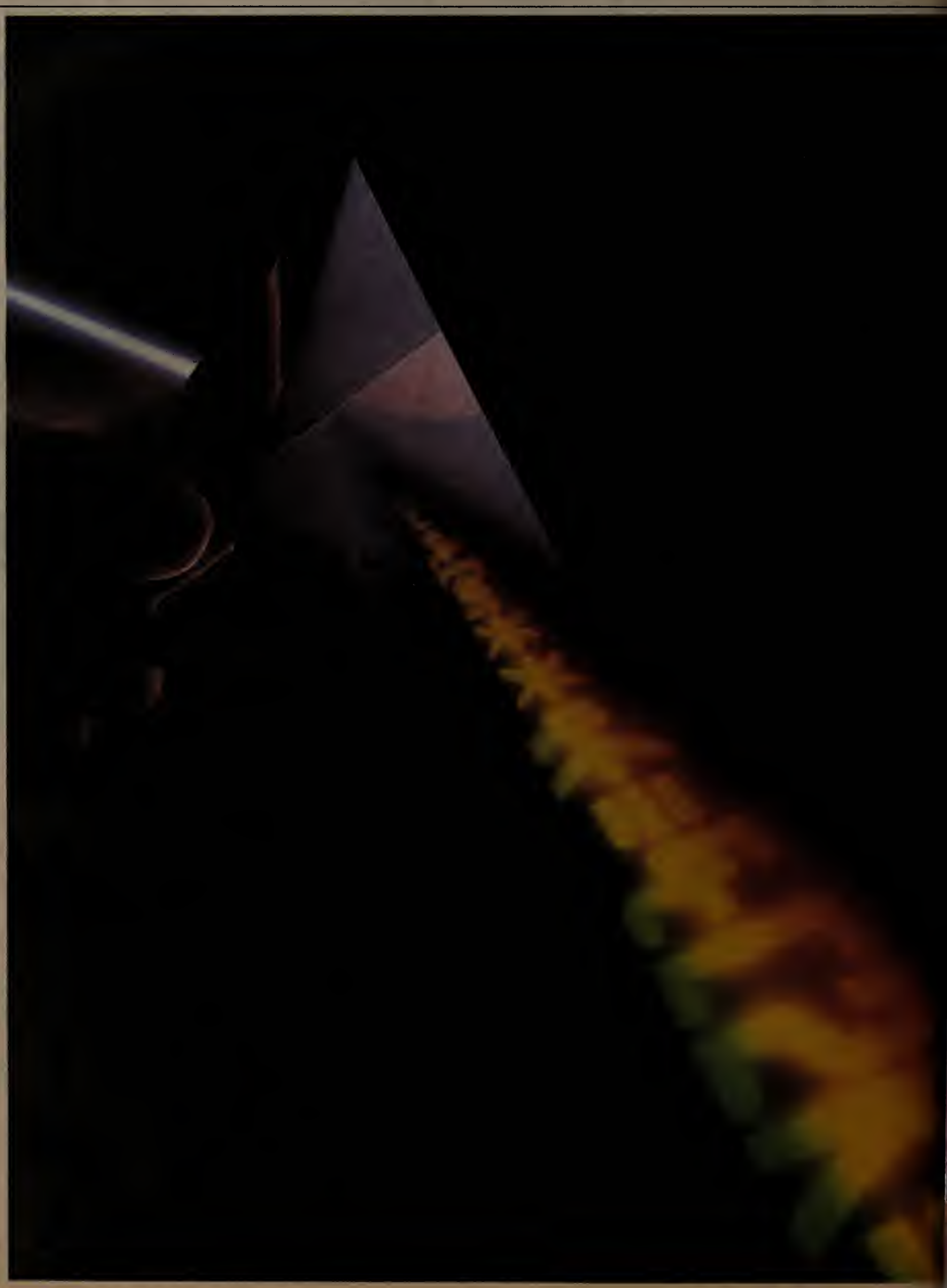
The Commerce Department is directed to maintain a commodity control list (CCL) that includes all goods and technology subject to national security controls. At the same time, the Defense Department bears primary responsibility for developing a list of militarily critical technologies (MCTs), with primary emphasis on:

- Arrays of design and manufacturing know-how.
- Keystone manufacturing, inspection and test equipment.
- Goods accompanied by sophisticated operation, application or maintenance know-how, which are not possessed by countries to which exports are controlled under this section and which, if exported, would permit significant advance in a military system of any such country.

The Defense Department was required to publish an initial MCT list in the Federal Register no later than Oct. 1, 1980, and a final MCT list was supposed to be incorporated into the CCL. Although a preliminary list was published in 1980, Defense has never published a final list, and parts of the list remain classified.

In order that the U.S. not be alone in restricting exports for national security purposes, the EAA instructs the president to begin negotiations with countries participating in a group called the Coordinating Committee, or Cocom. Cocom is currently composed of the U.S. and 14 of its European allies. Specific negotiation objectives include agreements on the scope and enforcement of mutually acceptable controls.

Section 5 also contains a number of provisions intended to mitigate the administrative burdens imposed by national security



controls. First, Congress encouraged Commerce to require qualified general licenses — granting permission to make multiple exports to an approved consignee — instead of individual validated licenses as often as consistent with the national security of the country.

Second, Commerce is prohibited from requiring a validated license for goods or technology that are available from foreign sources in sufficient quantity and quality so that the requirement of a validated license is or would be ineffective in achieving the national security goals.

Third, the EAA permits Congress to index its national security controls, thereby increasing the performance levels of goods and technology subject to any licensing requirement to exclude newly obsolete goods.

Fourth, the EAA provides that Commerce shall establish Technical Advisory Committees (TACs) for any industry requesting it, and shall convene meetings of the committee regularly.

Section 6 of the EAA authorizes the government to impose export controls for foreign policy reasons. The act requires that, before imposing foreign policy controls, the government shall consider:

1. The probability that such controls will succeed.

2. The compatibility of the proposed controls with U.S. foreign policy objectives.

3. The reaction of the other countries to the controls.

4. The likely effect of the controls on the export performance of the U.S.

5. The ability of the U.S. to enforce the controls.

6. The foreign policy consequences of not imposing the controls.

The act further provides that foreign policy controls shall expire automatically after one year unless extended and that any extension shall not be for a period of more than one year.

The EAA provides both criminal and civil sanctions for violations of the act or the attending regulations. Criminal penalties may be imposed for knowing or willful violations of the act, ranging up to 10 years' imprisonment plus the greater of $1 million and five times the value of the exports involved.

Civil penalties may be imposed by the head of any department or agency exercising any functions under the EAA and may include penalties of up to $10,000 per violation. Current law expressly authorizes suspension or revocation of export authority only for violations of the boycott provisions of the act.

Under the EAA as currently drafted, any department or agency with responsibilities under the act has enforcement authority. As a practical matter, primary responsibility for enforcement resides with the Department of Commerce.

Commerce Regulations

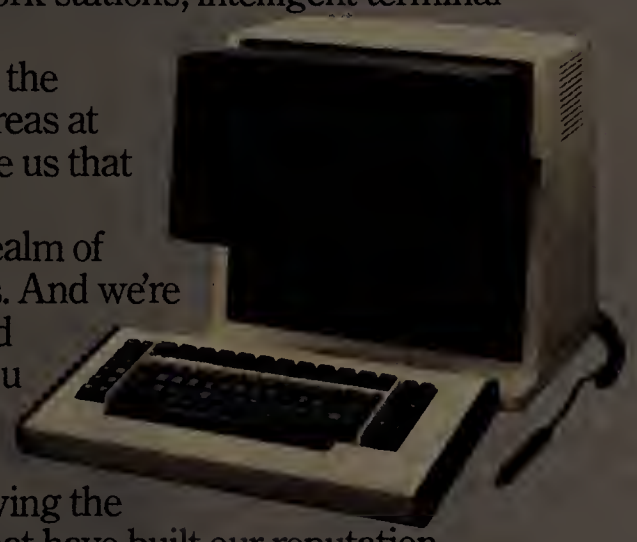
In order to implement the EAA, the Department of Commerce has published a long and complicated set of regulations at 15 CFR Parts 368-399. The regulations are so complex that they defy

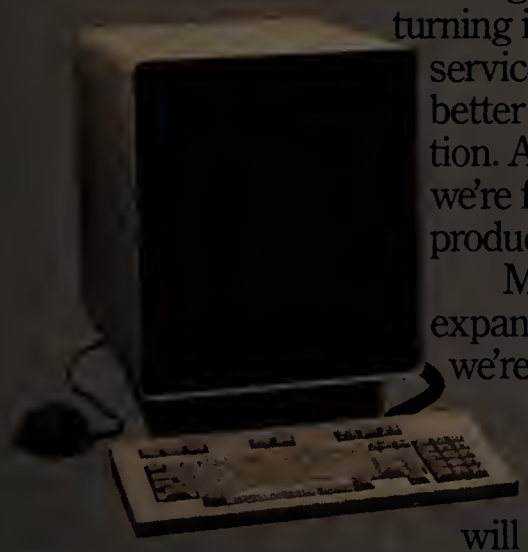
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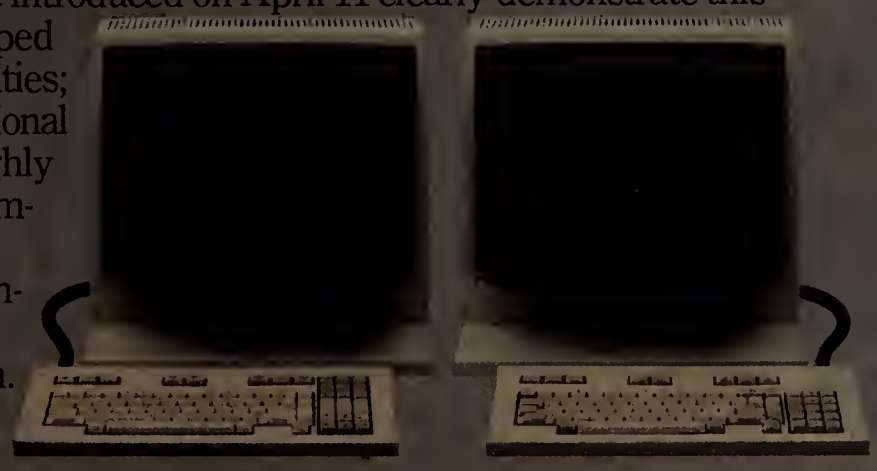




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brief explanation. This article attempts to describe only those aspects of the regulations important to the legislative issues.

The regulations describe two entirely different sets of licensing requirements, one for technical data and the other for commodities. "Technical data" includes computer software and at least some computer services while the term "commodity" includes hardware. It is important to note that a transaction may involve compliance with both sets of requirements, such as where a given applications program (technical data) is exported on a read-only memory (ROM) or magnetic tape (commodity).

The regulations provide for two basic categories of "licenses" to authorize exports. A general license is, in fact, a waiver of the requirement that the exporter submit a license of application to the Department of Commerce. A validated license is required for transactions for which a general license is not available. A validated license authorizes its holder to export specific items to specific customers (called "consignees" by the regulations). There are five types of validated licenses, ranging from individual licenses authorizing single transactions to distribution licenses authorizing exports of a specific commodity to an approved group of consignees.

In the simplest of terms, whether a particular license is available or required is determined by two factors: the item to be exported and the location of the consignee (or the party to whom the consignee will reexport the item).

Under current regulations, most technical data is exportable under general license to any place in the noncommunist world other than Libya. The exporter qualifies for a general license by obtaining from the consignee written assurances that the technical data will not be reexported to a communist country. There are, of course, exceptions, with the broadest exceptions applying to technical data relating to nuclear applications, military applications and certain electronic recording equipment. Once again, exports not qualifying for a general license require a validated license.

The rules for computer-related commodities are substantially more exacting. Any such export transaction worth more than $1,000 requires a validated license. Exports of computer-related commodities are eligible for a general license only if the total transaction is worth less than $1,000 and the consignee is located in a noncommunist country other than Libya.

In summary, Department of Commerce regulations grant a substantial amount of flexibility to computer services firms doing certain types of business with the noncommunist world. Information and software may normally be exported under a general license. Other types of transactions — involving commodities — will normally require a validated license, regardless of the consignee's location.

Legislative Proposals

Six bills seeking to revise or replace the EAA have been introduced as of April 5, three each in the House and Senate, although one has been withdrawn. This section summarizes the major thrust of the remaining bills. (The Reagan administration is expected soon to formulate a proposal incorporating aspects of some or all of the bills discussed below.)

S. 397 — Export Administration Act Amendments of 1983, Heinz (R-Pa.). Introduced Feb. 2, 1983. Referred to Banking, Housing & Urban Affairs Committee.

S. 397 would leave national security controls basically as they are but would make relatively major adjustments to the EAA provisions dealing with foreign policy controls. The bill attempts to limit further the president's ability to impose foreign policy export controls and would require that such export controls be accompanied by import controls as well.

Other provisions of the bill would change the manner in which Commerce determines foreign availability, would move responsibility for enforcement from Commerce to the Customs Service and would shorten

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the time in which the government must deal with license applications.

S. 397 would make no major adjustments to current national security controls. Section 17 would require the Commerce Department to develop and encourage the use of "special licensing procedures" allowing multiple exports of goods and technology to approved consignees without requiring individual validated licenses for each export. It is not clear how these special procedures would differ from the qualified general license and distribution license currently authorized by Commerce regulations.

Section 2(c) would shift the burden of determining foreign availability from the applicant to the Department of Commerce. It instructs the department to accept a license applicant's representations regarding foreign availability unless those representations are contradicted by reliable evidence.

In contrast, current law states that before foreign availability can justify the grant of a license, a determination of foreign availability must be made by Commerce in writing and supported by reliable evidence.

Section II would add a provision requiring the U.S. Customs Service, in consultation with Commerce and the Federal Bureau of Investigation, to provide exporters with advice and technical assistance to develop security systems that would prevent violation or evasion of national security controls.

S. 397 would make it more difficult to impose foreign policy controls. Section 6 would require that whenever exports are curtailed to a particular country, all imports from that country must also be prohibited, subject to such exceptions as the president may prescribe.

Section 7 would tighten the criteria on which the decision to impose foreign policy controls must be based. That section would allow foreign policy controls to be imposed only if the president *affirmatively determines* that the controls would achieve their purpose; would be compatible with U.S. foreign policy; would be supported by other countries; would not have an adverse extraterritorial effect on countries friendly to the U.S.; would not adversely affect U.S. export performance or competitive position; and would be enforceable. This wording contrasts sharply with current law, which requires only that the president *consider* each of the above factors.

As with national security controls, section 2(c) would require Commerce to accept an applicant's representations regarding foreign availability unless contradicted by reliable evidence. Section 15 would protect the sanctity of contracts signed before foreign policy controls are imposed, removing the retroactive effect of the controls.

Section 16 would cause foreign policy controls to expire automatically after six months, compared with the current one-year limitation.

Section 4 would move responsibility for enforcing the export licensing requirements to the U.S. Customs Service from Commerce.

Section 3 would make it a crime willfully to possess or attempt to possess anything for illegal export or to conspire to export anything illegally.

S. 397 would also add to the potential civil penalties for violating federal law. Section 5 would expand Commerce power to revoke or suspend export authority for violation of any export law, rather than just for violations of the EAA boycott provisions. Section 8 would allow Commerce to revoke also the authority of persons found in violation of the act to *import* goods and technology into the U.S.

Section 10 would reduce the time periods involved in the licensing procedure by one-third. For example, Commerce would be permitted 60 rather than 90 days to review an application; other departments or agencies would have 20 rather than 30 days to review applications referred to them.

Section 14 would require the president to negotiate with Cocom countries in order to raise Cocom to treaty status.

S. 407 — Export Administration Enforcement Act of 1983, Nunn (D-Ga.). Introduced on Feb. 2, 1983.



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Referred to Banking, Housing & Urban Affairs Committee.

S. 407 would make one major change to the EAA: It would move the responsibility for enforcing the act from Commerce to the U.S. Customs Service.

Section 3 would grant Customs officers authority to search on "reasonable cause," make arrests without warrants and refer violations to the Treasury Department for civil action or to the Department of Justice for criminal prosecution. Section 3 would also grant the Customs Service authority to impose civil penalties for violation of the act.

Section 2 would make it illegal to possess or attempt to possess anything with intent to export it in violation of the act.

Section 4 would require Commerce and the Customs Service to monitor contracts between communist countries and people in the U.S. to ensure compliance with the EAA.

S. 434 — Office of Strategic Trade Act of 1983, Garn (R-Utah). Introduced Feb. 2, 1983. Referred to Banking, Housing & Urban Affairs Committee.

S. 434 would substantially revise the U.S. export licensing system. The bill recites a finding that exports of sensitive technologies to the Soviet bloc threaten U.S. national security and failure to restrict such exports is attributable to diffuse decision-making power and lack of adequately trained personnel. The bill proposes to remedy these problems by creating an Office of Strategic Trade to administer the export licensing system.

Section 5 of S. 434 would establish the Office of Strategic Trade (OST) as an independent agency of the federal government. OST would assume the export administration responsibilities of the Department of Commerce and the Department of State's East-West Trade Office and Munitions Control Office.

OST's licensing responsibilities would be carried out by a Licensing Division. There would be nine offices within the Licensing Division, including an Office of Computer Licensing, an Office of Electronics and an Office of Technical Data.

S. 434 expands the scope of the export controls by expanding the definition of "technology." The EAA currently defines technology as know-how relating to goods, including computer software and technical data, but not the goods themselves. Section 4(4) of S. 434 adds the following language to the definition: "Information or know-how may take tangible form, such as models, prototypes, drawings, sketches, diagrams, blueprints or manuals, or take an intangible form, such as training or technical services. Technological data shall also include all goods or commodities that will be used in the industrial application of the technological information, regardless of the end-use classification of goods or commodities."

Thus, it appears that under the bill, an article not controlled for its own attributes might in any event be controlled due to its usefulness, however minor, in a technologically important activity.

The bill creates within the Department of Defense a National Security Control Agency (NSCA) to carry out that department's export administration responsibilities. NSCA would be located within the Office of the Undersecretary of Defense for Policy.

S. 434 makes two significant revisions to the provisions regarding the militarily critical technologies list. First, Section 7(d) would add to the MCT list "goods (i) which would extend, complete, maintain or modernize a process line employed in the application of a militarily critical technology, or (ii) the analysis of which would reveal or give insight into a United States military system and would thereby facilitate either the design and manufacture of that system or the development of countermeasures against that system."

It *appears* that this addition would not directly affect the providers of computer services. Section 4 of S. 434 (section 16 of the EAA) defines "goods" to exclude technical data, and Section 4 adds to the definition of "technology" a reference to "technological and technical data" and specifically includes computer software. The fact remains, however, that all militarily critical technol-

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ogies may under existing statutory language be subjected to stricter controls than they have been to date.

The second major change regarding MCTs is that S. 434 would eliminate the requirement that the Department of Defense publish the MCT list in the Federal Register. The EAA required the Department of Defense to publish the MCT list on or before Oct. 1, 1980; however, a final MCT list has never been published and parts remain classified.

The bill contains several other provisions affecting national security controls.

Section 7(h)(4) adds a provision to the effect that foreign availability does not justify the grant of a license unless the Secretary of State verifies that negotiations with the appropriate foreign governments have been undertaken to eliminate the foreign availability. Section 7(j), regarding multilateral export controls, eliminates from the list of negotiating objectives the goal of a Cocom agreement to reduce the scope of multilateral export controls to a "level acceptable to and enforceable by all governments participating in the committee."

Section 7 would also omit the indexing provision of the EAA that permits export regulations to provide for annual increases in the performance levels of goods or technology subject to the licensing requirements.

H.R. 483 — Strategic Trade Act of 1983, Byron (D-Md.). Introduced Jan. 6, 1983. Referred jointly to the Committees on Foreign Affairs and Armed Services.

The major effect of H.R. 483 would be to place the responsibility for administering national security controls in a new agency within the Department of Defense. The bill recites a finding that the failure to restrict the transfer of national security sensitive technology and goods to the Soviet bloc has created a greater threat to the security of the U.S. and its allies. The bill further recites that the failure to restrict such transfers is attributable in part to the diffusion of decision-making responsibilities regarding strategic trade matters among several federal agencies, the lack of adequately trained and disciplined personnel and the lack of adequate authority resting with the Secretary of Defense.

Section 5 would create within the Department of Defense a National Security Control Agency, which would be within the Office of the Undersecretary of Defense for Policy including a Licensing Division. Within the Licensing Division, there would be seven offices including an Office of Computer Licensing, an Office of Electronics and an Office of Technological Data.

H.R. 483 would make several changes to the existing national security controls. Section 7(d) would remove the requirement that the MCT list be limited to militarily critical goods and technologies and the mechanisms through which such goods and technologies may be effectively transferred; instead, the section would attempt to ensure that the export controls cover and adequately control such goods, technologies and mechanisms. Thus, H.R. 483 apparently accepts the risk that the list will be too broad.

That section would also add to the list of critical technologies "goods (i) which would extend, complete, maintain or modernize process line [sic] employed in the application of a militarily critical technology, or (ii) the analysis of which would reveal or give insight into a United States military system and would thereby facilitate either the design and manufacture of that system or the development of countermeasures against that system, which, as determined by the Secretary of Defense, are not possessed and able to be utilized by the country to which exports are controlled under this section and which, if exported, would permit a significant advance in a military system of any such country." The comments regarding similar language in S. 434 are equally applicable here.

With respect to foreign availability, H.R. 483 would not require, as is required under current law, elimination of validated license requirements for goods available from foreign sources in sufficient quantity and quality. The bill would further

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add a provision to the effect that foreign availability would not justify a grant of a license unless the Secretary of State verifies in writing that negotiations with the appropriate foreign governments have been undertaken and have not been successful in eliminating the foreign availability.

Section 8(c)(2)(B) would allow the head of any department or agency exercising any function under the bill, if he has *reason to believe* that a person has violated this bill or any regulation promulgated thereunder, to suspend the authority of that person to export or import from the U.S. any or all goods or technology, whether or not such goods or technology are related to the specific violation, and thereafter order the seizure of any goods or technology intended for export or import in violation of the suspension order.

H.R. 483 does not by its terms renew the EAA and does not provide for foreign policy controls, scarce supplies controls or boycott controls. This bill would presumably be supplemented by other legislation for those purposes.

H.R. 1566 — Export Control and Promotion Act of 1983, Bonker (D-Wash.). Introduced Feb. 22, 1983. Referred jointly to Committees on Foreign Affairs and Rules.

H.R. 1566 is different from the legislation discussed above in that it does not propose to increase the restrictions currently imposed by the EAA. Furthermore, it would authorize an appropriation of $100 million to Commerce for development of trade and information programs for U.S. companies, development of export policies and exhibition of U.S. goods in foreign countries.

Section 101 would create a new type of license allowing multiple exports by domestic companies to overseas affiliates and subsidiaries.

H.R. 1566 would remove export controls from certain categories of transactions. Section 102 would remove controls from exports of goods or technology to a country which maintains export controls on such goods or technology cooperatively with the U.S. That section would also decontrol export of any good, but apparently not technical data, if Commerce grants every application for a license to export that good filed within any one-year period.

Further, the bill would prohibit the imposition of controls solely on the basis that a good contains nonreprogrammable imbedded microprocessors. Export controls could be imposed on such a good only on the basis that its functions are such that it would make a significant contribution to the military potential of any other country to the detriment of American national security.

Section 103 would require the president to consult with other countries before imposing foreign policy controls. Section 104 would prevent the application of foreign policy controls to existing contracts. Section 105 defines the scope of foreign policy controls to cover goods and information produced in the U.S., apparently without regard to whether the goods or technology are within U.S. jurisdiction. Section 105 further provides lengthy procedures by which the president would obtain congressional approval for the imposition of foreign policy controls.

Section 106 would make illegal the possession of anything with intent to export it illegally, or with knowledge that it will be exported illegally, and conspiracy to export illegally. It would also provide for forfeiture of the subject property.

Section 107 would increase the power of Commerce employees by allowing them to carry firearms, to make arrests without warrants, to search with probable cause and to seize with probable cause. Customs officers would be limited to inspection and search, detention and seizure. In addition, the Customs Service may spend no more than $15 million in enforcing the EAA and may make no random inspections.

About the Author

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Wormser holds a law degree from Ohio State Law School.



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THE IRM PERSPECTIVE



By Charles C. Wood

Information resource management (IRM) is a perspective and an approach often associated with, although not necessarily dependent on, specific implementation tools and techniques. Underlying IRM is the recognition that information per se is an important organizational resource that can be handled efficiently and effectively with traditional resource management tools and techniques. It posits that traditional resource management techniques, such as inventorying, cost accounting and budgeting, can (with slight modifications) be applied to information itself. It also holds that automated tools such as data dictionaries can be fruitfully applied to organization-wide infor-

mation. The major distinction between past approaches and IRM is that the former have concentrated on managing resources that go into providing information (people, computers) while the latter concentrates on managing information as an organizational resource.

Classical economic theory has maintained that resources — that is, factors of production — fall into one of three groups: land, labor and capital. More contemporary economic theory establishes four categories of resources: manpower, money, machines and materials. As our society becomes increasingly information-based and information-dependent, we come to realize that information should be added to the list.

An analogy to the personnel function, more recently referred to as the "human resources" function, illustrates the intent of IRM. In medium- to large-scale U.S. organizations, staff members are typically managed by their line managers. Human resources department personnel do not manage people directly; instead, they provide policies, guidelines, standards, plans and training. Middle managers are not permitted to hire, transfer, promote or fire employees in any manner they choose; they must comply with directions established by the human resources department. Nonetheless, these managers can, with relatively few constraints, purchase information-handling equipment, change such systems and create new information-handling procedures.

As people become increasingly computer-literate, they appreciate how such changes can have profound long-term effects. To achieve better information system coordination, system integration, information sharing, information awareness and system cost reduction, IRM advocates the development of a more formalized structure to support organizationwide information management activities.

This formal structure does not imply a move toward the establishment of an information czar or central information controlling authority. IRM is a quasi-centralized approach that retains centralized authority and control for only those matters that need to be centralized and distributes the balance. Thus, at one firm, an IRM group and central management that supports the group may retain control over corporate network protocols, data formats and other standards, whereas distributed users may have control over programming for their decentralized machines.

IRM is distinct from information resources management (note the "s" on "resources"). Information resources management involves establishing one high-level executive to oversee all information-handling activities, such as data processing, telecommunications, internal mail, the library, word processing, and copying and printing. Information resources management can work synergistically with IRM, but they are two separate and distinct approaches.

IRM is a synthesis of several approaches that have been demonstrated to be useful in managing information. It combines general management (resource handling), computer systems management, library science and policymaking and planning approaches. It is the next step in the evolution of information management thought and not a panacea or a fully developed approach.

Applying the Tools

Application of IRM typically entails the coordinated use of a number of generally available tools and techniques. Among these are: top-down systems design, structured systems design, business systems planning methodologies, data flow diagramming, information requirements analysis, data base modeling approaches, information centers and data dictionaries. Current use of these tools and techniques by a large number of computer installations indicates that there is a recognition of a need for more formalized and integrated information management approaches. IRM embraces such approaches and coherently fits them together.

The data dictionary is the tool that to date has been applied most fruit-



fully in support of IRM. A data dictionary is necessary but not sufficient for a successful IRM effort. A data dictionary, most often maintained by a computerized software package, is a master index to data and information (no distinction between data and information is made in this work).

A data dictionary is like an English language dictionary and a telephone book all wrapped into one data base. It is like a dictionary in that it contains information defining and specifying the characteristics and uses of information. It is like a telephone book in that it contains information about the location and procurement of information. A data dictionary acts as the focus of an IRM group's work in that it is a central and authoritative reflection of an organization's important information-handling activities. While data dictionaries have been in existence for some time, they have not previously been applied to the organization as a whole.

Support Staff

The establishment of a staff group to support the IRM approach is recommended, although not essential to realizing IRM's benefits. This approach has been adopted by several of the large firms now embracing the IRM perspective (a desire to better handle the complexities associated with the information operations of large firms has been a major impetus for adopting the IRM approach). Such a group should be organizationally independent of information-handling service providers, such as a data processing department. This independence is essential because it:

- Allows the IRM group to concentrate on designing an information architecture that best supports organizational goals and objectives; group members are not distracted or otherwise influenced by operational activities.
- Allows the IRM group to best reconcile the wishes and needs of various groups, such as users and information-handling service providers, in a manner consistent with management intentions.
- Lessens the likelihood that inappropriate technical solutions will be adopted because of a conflict of interest. For example, DP personnel might believe that centralized mainframe-based solutions are appropriate for nearly all applications.

Variety of Benefits

A wide variety of benefits can be obtained with this new approach. IRM can help information systems better support organizational goals and objectives (for instance, by making a more explicit connection between an organization's business plan and its systems plan) and help management control these information systems. More directed, cost-effective and coordinated systems development, maintenance and planning can also result. Better management decision-making support, more timely responses to ad hoc information requests (primarily via a data dictionary) and more formal evaluation of organizational and/or information system changes can also come from using the IRM approach.

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Very importantly, the approach can also allow organizations to better support information security, privacy and auditing efforts. The remainder of this article addresses these potential benefits.

The major tool for implementing IRM is the organizationwide data dictionary. While the following discussion in some instances may refer to the results of using IRM, on a

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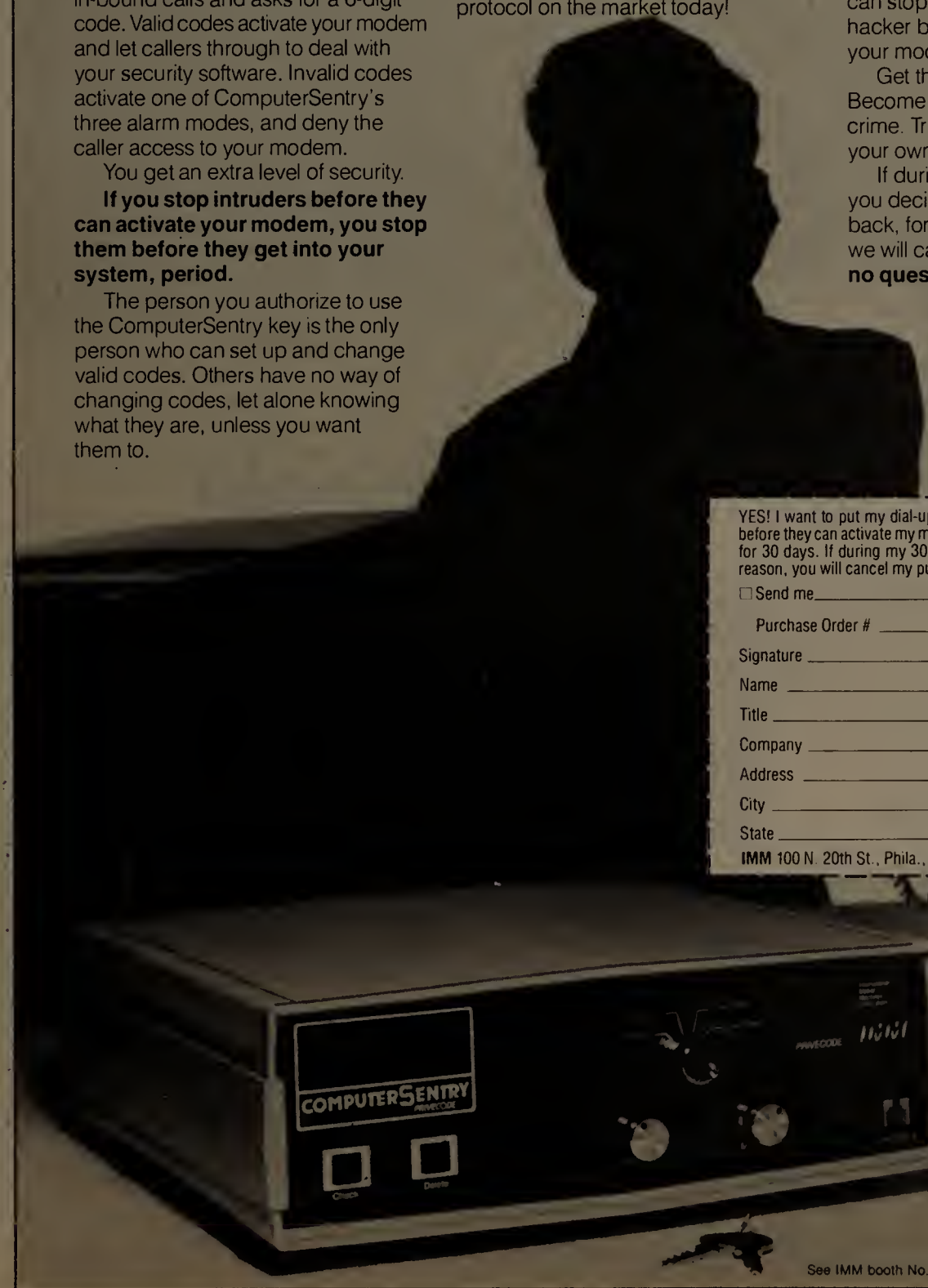
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more specific basis it may refer to the results of using a data dictionary. The use of the broader and more encompassing term (IRM) is intended to keep the discussion widely applicable; other benefits have not been mentioned, and the discussion thus is broad.

Controls Suboptimization

One of the most significant problems in the way many organizations address information security is suboptimization. Many firms use an incremental risk reduction approach, identifying a single vulnerability and applying a control like a Band-Aid. Although the security of information systems as a whole may be increased incrementally with each such improvement, typically little consideration is given to how the control could be applied on a broader, cross-application, cross-system or cross-group basis.

Because a detailed, technical focus is taken, an opportunity for the broader application of a control may be missed. With the incremental approach, short-term needs that have been identified are met, but long-term expenditures for information security are likely to be greater than necessary.

IRM involves the creation of an information architecture (a model of the information infrastructure for a firm). This high-level description of the information-handling activities details the movement and transformation of information between applications, between computer systems and between organizational groups.

Through creating and maintaining a data dictionary, the organization formally documents and categorizes information-handling activities. An information architecture and a data dictionary can give people addressing information security a higher level perspective of the information activities of a firm, which can permit them to apply controls on a more holistic and optimized basis, thereby perhaps gaining economies of scale.

Maginot Line Syndrome

Like a chain, the security of an information system (or a firm, for that matter) is only as strong as its weakest link. Assuming that they know of the alternatives, intruders will be inclined to use the least costly (lowest work-factor) method to compromise the security of an information system. The Maginot Line syndrome refers to an uneven line of defenses against intrusions and abuses. For example, an organization may protect proprietary data with encryption, system passwords, personnel policies and other controls but allow employees to throw hard-copy computer output in the trash without first having shredded it.

Many firms suffer from this syndrome because those addressing information security have a narrowly focused perspective. This situation occurs because these people are not always involved in system planning, in building an information architecture for the firm and in activities that could provide them with more of a balanced and comprehensive viewpoint.

Having reference to the high-level information documentation prepared by an IRM group, information security personnel can obtain an overall perspective and are consequently able to develop a unified security program that does not suffer from the Maginot Line syndrome.

Top Management Support

The adequacy of information security efforts depends largely on upper management's understanding of the problem and of the extent to which it needs resources. In general, management has not understood the changing nature of information vulnerabilities, the complexity of these vulnerabilities and related controls, the need for ongoing vigilance and the serious consequences that could befall a firm that has not taken appropriate precautions. Until top management has a greater understanding of information security, inadequate safeguards will leave significant exposures unaddressed.

Inherent in the IRM approach is the recognition that financially oriented resource management techniques, such as cost accounting and

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budgeting, should be applied to information. As the demand continues to outstrip the supply of useful information, increasingly the market mechanism will be used to allocate information resources to those who need them most.

As information is increasingly the subject of financial analysis, it is being recognized as a commodity. User fees for access to data bases are but one example of the prices that are being assigned to information itself. As its value is better understood, management will be better able to estimate impacts of not appropriately addressing information security.

For example, as managers become better acquainted with the financial repercussions of a major fire in a company's only DP center, they will be more likely to be willing to allocate resources to preventing catastrophic loss due to unforeseen contingencies. An IRM group, by formally assigning costs and benefits to information in the course of its planning efforts, and by fostering a closer look at information itself, can help management appreciate the nature of information security and the need for greater financial support of computer security efforts.

Contingency Planning

As used here, the term "contingency planning" addresses recovery from both disasters (large-scale unfavorable events) and emergencies (unforeseen circumstances resulting in the need for immediate action). Many firms do not, for instance, have adequate off-site storage of copies of essential information, contracts with vendors regarding replacement hardware or a list of people who should be notified in a disaster or emergency.

These firms have frequently not seriously considered the possibility that a plane could collide with a data center, that an earthquake could seriously damage equipment or that a major fraud could cause many of their customers to do business elsewhere. In addition, they have typically not prioritized their applications or come to terms with what information activities are essential to the firm's viability.

Part of the implementation of IRM should, according to a number of specialists in the field, involve extensive research to document and understand the important information activities of the firm. To accomplish this goal, IRM staff interviews managers, systems users and systems service providers to determine what information-handling activities are critical to the organization. The critical activities identified are then the focus of IRM efforts, such as the inclusion of information about these activities in the data dictionary. The process of characterizing critical information-handling processes can provide a contingency planning effort with valuable information.

Furthermore, quantitative risk analysis can be facilitated with IRM. The intent of this approach is to arrive quantitatively at a prioritization of the exposures facing information systems. Quantitative risk analysis involves probability theory, statistics and estimation of losses under various conditions. A thorough knowledge of the information held and handled by an organization is a prerequisite to performing a risk analysis. This knowledge can be obtained in part from the data dictionary prepared in an IRM effort.

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In addition, both a data dictionary and the risk analysis that can be based in part upon it can be of significant assistance to DP auditors. Auditors need some sense of the relative

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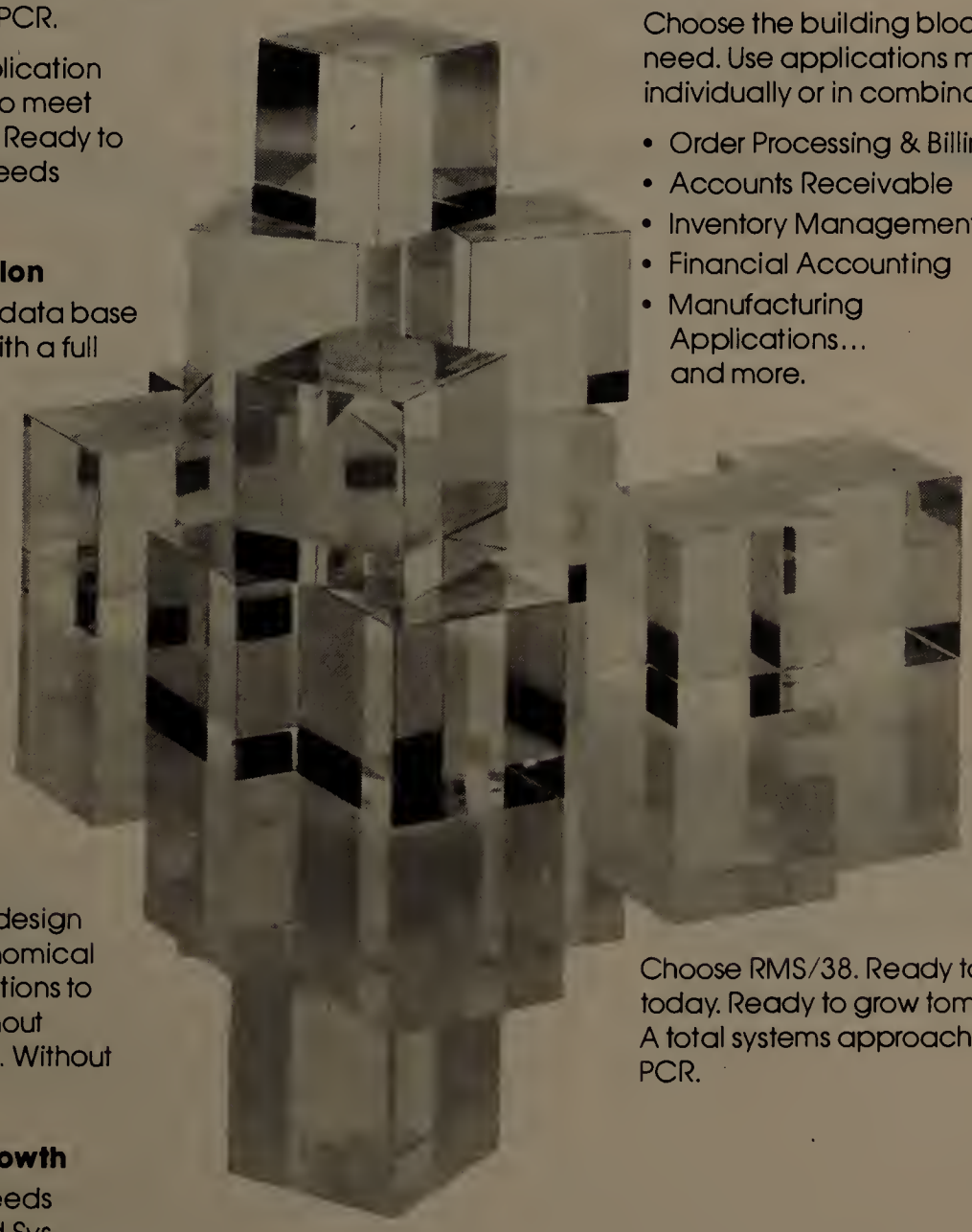
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importance of various information activities so that they can prepare audit plans and allocate their time to the most important areas.

Security Policymaking

In many firms, information security policymaking has received only scant attention. Progressive firms, for example, have prepared policies regarding such important areas as codes of conduct addressing information issues (including such matters as personal use of the employer's computer facilities) and which personnel are permitted to have access to what types of information. Neglect of these matters has left many employers unduly exposed and their employees confused about appropriate behavior and management intentions.

The IRM approach should be implemented with a staff group that reports to the vice-president of administration or to some other executive not directly involved in a firm's information-handling operations. One of the advantages of this approach is that the group is organizationally positioned so that it can perform information-focused planning and policymaking tasks.

For example, the group can research and make recommendations on the alternatives being considered by an information systems executive committee. That committee, as defined here, decides how resources are to be allocated to information systems, what information policies should be established and related organizationwide matters. If an IRM group provides assistance to this type of a committee, it can thereby provide the committee with the information it needs to make sound decisions but would otherwise not have the time to obtain.

The process of putting together a data dictionary can force management to make information policy decisions. Entries for specific items of information within a data dictionary show how the information can be obtained and who has access privileges. The very process of preparing a data dictionary can force an organization to explicitly determine access rights for important information. The process may reveal that the firm needs a data classification scheme, where data is marked with a certain identifier such as "confidential," "secret" or "top secret."

Because a data dictionary is a highly formalized and cross-referenced tool, the process of building a data dictionary allows the IRM group to address information security policymaking with a structured, top-down approach. The decisions made in the course of defining access privileges to information may also be of use to those who are installing an information access control package.

Because the access privileges documented in the data dictionary are defined in terms of information and not the supporting technology, they can be more resilient to change. Thus, when the computers or other technology used to transfer, transform, store and present information are changed, the access policies developed can ease the transition to new technology and with minimum expense ensure that the new environment will adopt similar security measures.

For example, having separate individuals act as makers, checkers and signers of financial instruments has been a traditional separation-of-duties policy. If this policy is implemented in a manual environment using pen and paper, it can be easily changed to a computerized environment with the use of digital signatures, passwords or some other authenticator uniquely linked to an individual.

Noncomputerized Information

While computer crime has of late been the subject of extensive discussion and publicity, the manual information-handling environment continues to have its own significant exposures. Large organizations have been responding to concern about computer security by establishing computer security officers, but many firms have no such position for information handled manually. Because white-collar employees have been familiar with manual information-handling procedures for some time, some of them (erroneously) be-

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lieve that the information security problems in the manual environment have been adequately addressed and that these problems need not receive any special consideration.

The IRM approach involves consideration of information however it is handled and whatever form it takes. The approach concentrates on information and uses information itself as the basis for planning and policymaking activities. Adherence to the approach corrects the bias that some firms have toward paying an undue amount of attention to the security and control of computerized information.

The IRM approach also frequently involves preparing diagrams of the information flows throughout an organization (for example, Gane and Sarson's data flow diagrams). These diagrams can be used to identify information vulnerabilities at handling stages that may involve manual processes or computerized processes.

Resolving Security Problems

The primary tool used to support the IRM approach, the data dictionary, can be of significant assistance in resolving security problems rapidly and efficiently. Having one authoritative source for documentation about information or for pointers to documentation about information can help reduce some of the complexity and confusion that characterize many information systems. The data dictionary can serve as a reflection of current information standards.

For example, suppose a newly installed computer program were to update a master file improperly in a format different from that specified by a standard subscribed to by other programs. Moreover, suppose that this update causes the payroll application system to crash on the day before payday. Programmers could spend considerable time investigating the nature of the problem if a data dictionary were not available.

If, on the other hand, the data dictionary were available, these programmers could determine what programs accessed the master file and how these programs may have changed the master file; the process of identifying the problem and consequently resolving it thus could be streamlined. In a more general sense, the structured documentation prepared by an IRM group can be of assistance to operations, systems development and computer security personnel.

A Few Caveats

Some circumstances indicate that IRM is not an appropriate approach for some firms. For example, a firm having severe financial difficulties may not be in a position to fund an IRM effort that will take a few years to show significant benefits. Another example is a holding company that buys and sells other companies; if only financial information were to be exchanged between the parent and subsidiaries, no substantial coordination or management of information may be called for, and IRM may not be appropriate.

Still another example is the small firm whose information systems have not yet become so complex that a formal IRM approach is called for.

While the IRM approach is applicable to a wide range of firms, circumstances and needs, it is not a panacea. Furthermore, because it is in its early developmental stages, significant disagreement exists about appropriate implementation.

While there is little agreement about what exactly constitutes IRM, increasingly people are coming to recogize that information is the glue that holds an organization together and that allows all other resources to be managed.

About the Author

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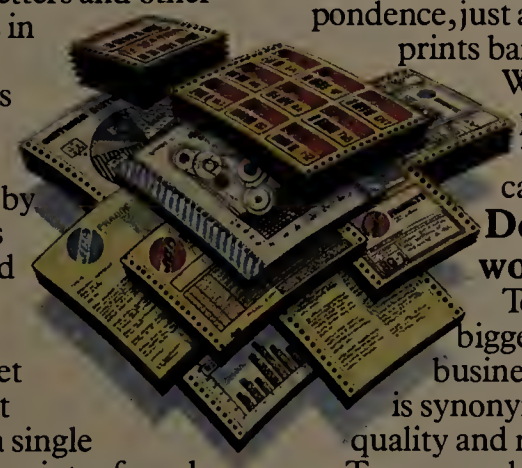
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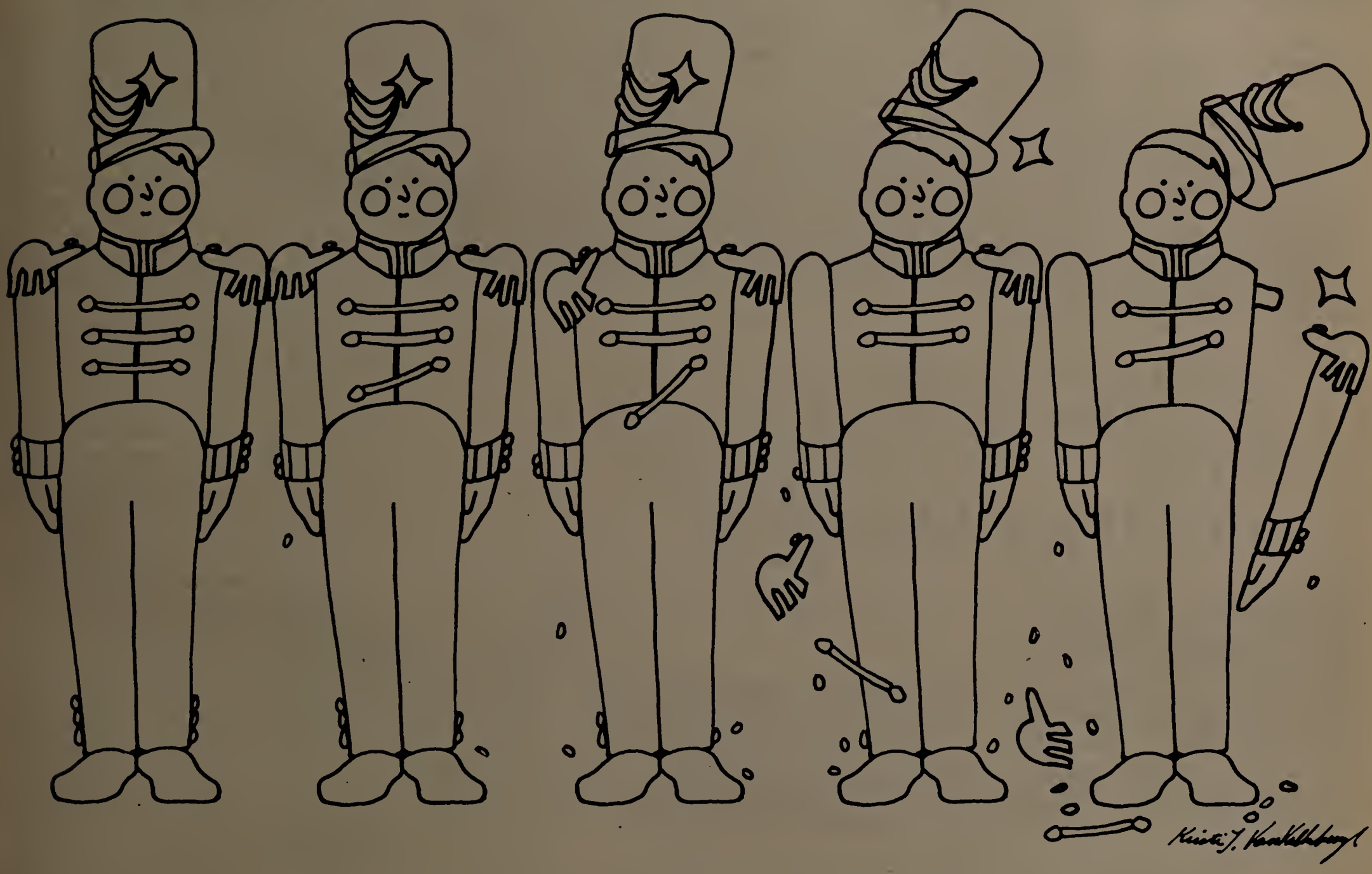
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MADE TO LAST?



Never Undervalue the User's Input to System Designs

By Jack O'Connor

It is one thing to be able to observe from hindsight that a system is successful. It is an altogether different matter to predict at the design stage whether a new system has the attributes necessary to lead to that conclusion after implementation.

Are your current systems a success or disaster? And how can you increase the ratio of good to bad systems you will install in the future?

A successful system saves money, but even the best system in the world won't save a nickel unless it is used. The most successful systems are used repeatedly. The period of use varies from minute-to-minute order entry, daily inventory, weekly payroll and monthly general ledger to annual federal reports and beyond. These systems survive the test of time. They stay in use over a period of several years. For someone in your organization, they save time and energy, which enhances productivity for the user.

If you can observe all of these elements in any of your systems, you can categorize them as very successful.

One caveat applies to the following general outline of success and failure traits. There are no absolutes in guaranteeing system success. Some of the items listed contain an element of generality. You may find a system that works well but doesn't fit comfortably within the guidelines presented here, but that will be the exception. This outline is a way of improving your probability of success and minimizing your probability of failure over the long run.

The principles are universal, though the scope of specific examples has been limited for the sake of brevity. These examples relate to a manufacturing firm but apply to all types of businesses.

If your system contains most of the following six characteristics (see In Depth/20), then you are off to a good start.

IN DEPTH

SUCCESS

1. Successful systems are requested by the user. This statement is not as frivolous as it may seem. There are numerous examples of software products that may be superb at performing their appointed tasks but vendors can't sell because no one needs that task performed.

Have you ever had a director of manufacturing ask you to write a program that will help the material control department do a better job? While it may be true that better material control will result in a better manufacturing flow and better shop floor efficiency, it is also true that if the request didn't originate in material control it will be a bitter pill to swallow for your materials manager. No one wants to hear that he is performing poorly, especially from outside his own group. The suggestion of change coming from the outside will activate defensive barriers that may be impossible to tear down.

It is far better to take the proposal, plant the seed of change with the materials manager, nurture it, feed it and allow it to blossom. If it is "his" idea, he'll work much harder to make the change succeed. It is also appropriate to react to a clever idea from one of your DP employees, but the first step must be to ask the potential user's opinion of its viability.

(Continued on In Depth/21)

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FAILURE

There are systems that exhibit some successful traits but in the final analysis don't live long enough to produce a worthwhile return on investment. Why? In basic terms, there are overriding factors that may contribute to a system's failure. Make sure your proposed systems do not contain any of the following harmful attributes.

1. Unsuccessful systems aren't wanted by the eventual end user. You might ask him, "Why won't you just trust me when I tell you that this system is the best ever designed?" He won't believe you if you haven't convinced him of the benefits to him. You can't just present a new system — you must sell it.

This point is a close corollary to "success trait" number one. If the user hasn't come to you looking for help on a particular problem, then your salesmanship will certainly be put to a severe test. The example of resistance by the materials manager to a suggestion for improvement by manufacturing holds true again, but what about the reverse situation? How would the director of manufacturing react to a proposal for capacity planning (a manufacturing tool) if the request had come from the materials manager? He may be indifferent to it, he may openly oppose it or worst of all, he may openly accept it but inwardly resent and oppose it.

Always keep in mind, however, that the user will have the last say. He is in control.

The bottom line here is that if you don't have 100% commitment from the intended user, don't waste time and money installing a system because you think you can convince him of its value once he sees it in action. You are betting against the house.

2. Unsuccessful systems solve a temporary problem. If you design a system to ease a capacity problem on a particular machine and then buy an additional machine to ease the load, then your system will die when the purchase is made. "Hot," spur-of-the-moment projects in DP are seldom cost-practical in the long run. To put it another way, if your payback period is going to be short, then look closely to see that you can recoup your investment quickly. If not, find another solution. At the risk of sounding heretical, be aware that some short-term tasks are done more cost effectively if they are done manually.

If a new government form arrives that demands a detailed break-down of inventory usage in classifications that you never dreamed of (for example, the MA1000 [mu] Annual Survey of Manufactures), look for alternatives before you write a "quick-fix" program. Maybe you have several different existing reports with subtotals that might be combined manual-

(Continued on In Depth/28)

MADE TO LAST?

(Continued from In Depth/20)

The probability of success rises proportionally with the user's level of desire to see his idea functioning. The more enthusiastic he is about the project, the more likely he will be to back its use in his department (or company). If a manufacturing supervisor casually approaches you and says, "Bill, I've been thinking that the efficiency reports we are getting might be more useful if you could add the time of day the work was done. Maybe we could find some trends during the shift that need attention." This comment is evidence of interest.

Suppose the same man tracks you down, looks you square in the eye and says, "Bill, we've got to get the time of day printed on our efficiency reports. I'm sure the efficiency in the afternoon is falling off, but I can't prove my point to the boss." Now you've got an enthusiastic and supportive user, one who will get the most out of the system.

The user can save a system that might otherwise be of marginal benefit, and he can absolutely kill a superbly designed system if he perceives it as only making a small contribution to his job performance.

The odds for success improve dramatically if an idea with potential has come from the eventual end user and not his manager. This situation offers the unique advantage of built-in pride of authorship, hence increased desire. Be sure to promote the user's contribution to the system throughout the design phase and especially at implementation. You can rely on a payroll clerk to get the most mileage out of a new deduction processing scheme if he thought of the idea and now has a chance to use it to do his job more efficiently. If the idea originated with the payroll manager, it may be viewed as just another unwanted "change." "Why are we changing again? I was just getting comfortable with the old way!"

2. Successful systems serve a purpose, and they do so at two organizational levels.

Working detail level systems help the user complete a specific business task such as ordering material, building an assembly, locating a potential client or paying a vendor or employees. Clerical and nonprofessional staff primarily use these systems. They are the day-to-day working heart of the company. A prime example in a manufacturing firm is an expedite list of parts that are urgently needed to continue a smooth flow of work on the shop floor.

Management summary level systems assist the management user in making decisions about alternative courses of future action such as working overtime, hiring more people, expanding facilities, laying off workers or shortening the workweek. A key feature here is the segregation of distinguishable data with level breaks, subtotals and, most certaintly, grand totals. An example, analogous to the expedite list from above yet for management use, is a summary list of the number of parts that must be expedited by each

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IN DEPTH

planner in the material control department. The manager would have a tool with which to gauge employee performance, make future personnel decisions and apply additional manpower to bottleneck areas.

It is imperative that you distinguish between the level of intended use before the detail design begins. More systems will survive if the design is done by employees at the level of intended use. Specifically, do not let a manager do detail design work on a system that will be used by his employees — even if the overall system concept was the manager's idea. The manager is (or should be) too far removed from the detail to know what is currently most useful to the detail workers. Explain the concept but then rely heavily on the intended user for ideas about design features.

Using the payroll example from earlier, suppose the deduction processing scheme alteration was the manager's idea. He wants to allow any payroll deduction amount on any employee store purchase and has the system eliminate the deduction record when the item is completely paid for. Fine, but who has to provide the specific deduction data in a format that is practical for both data entry and himself? The payroll clerk. That clerk must be the one who shows you how the information arrives at his desk and works out a compromise on input requirements.

There is a lot of expertise in your organization at the clerical level — use it. If the clerk participates in the design details of a system that he is going to have to use, he will be much more likely to understand the system and use it properly. Management should certainly review and approve the end results.

3. Successful computer systems make use of facets of DP that function best.

● High-volume activity. If you have one product and it has four components, then inventory control is an easy matter. If, on the other hand, you have 1,000 products, each of which has multiple levels of manufacture and a myriad of components, then a material requirements planning system may be essential for survival. Gains from automated systems grow proportionately with the number of records processed. The use of the relative term "high" must be placed in the context of your organization; for example, high volume of sales to American Motors is low volume to General Motors.

● Selection. Pareto's 80/20 rule states that 80% of our time is consumed on items that only represent 20% of the work to be done. When the rules for action can be clearly defined, the computer is an excellent tool to use to improve this ratio by identifying and extracting only the exception items to be worked on. A shop floor scheduler needs to know what parts must be worked on today (this morning?). He can't efficiently use a list of the 300 parts that must be made before next Friday.

● Sorting. Rearranging data into a sequence that can provide the most value to the user is essential. In fact, several different sequences can make the same data beneficial to more than one group. An inventory cycle count report listed in stock location sequence permits stockroom management to identify areas that require special attention. The same data listed in material control planner sequence will permit the planner to take corrective action in response to the reported stock variance and thus avoid future shortages or excesses.

● Calculations. Computers are still essentially numeric beasts which work well on arithmetic functions, especially repetitious ones. Total inventory value can be quickly and efficiently calculated (and recalculated) by extending unit cost times the variable quantity on hand and accumulating the sum.

● Data retention. As prices for all kinds of mass storage continue to drop, machine-readable storage for numerous historical records is becoming more cost-efficient than ever before. In fact, where no legal requirement exists for the retention of source documents, machine-readable storage may now be cheaper than bulk storage of data in its original form.

We must also recognize the poten-

(Continued on In Depth/27)

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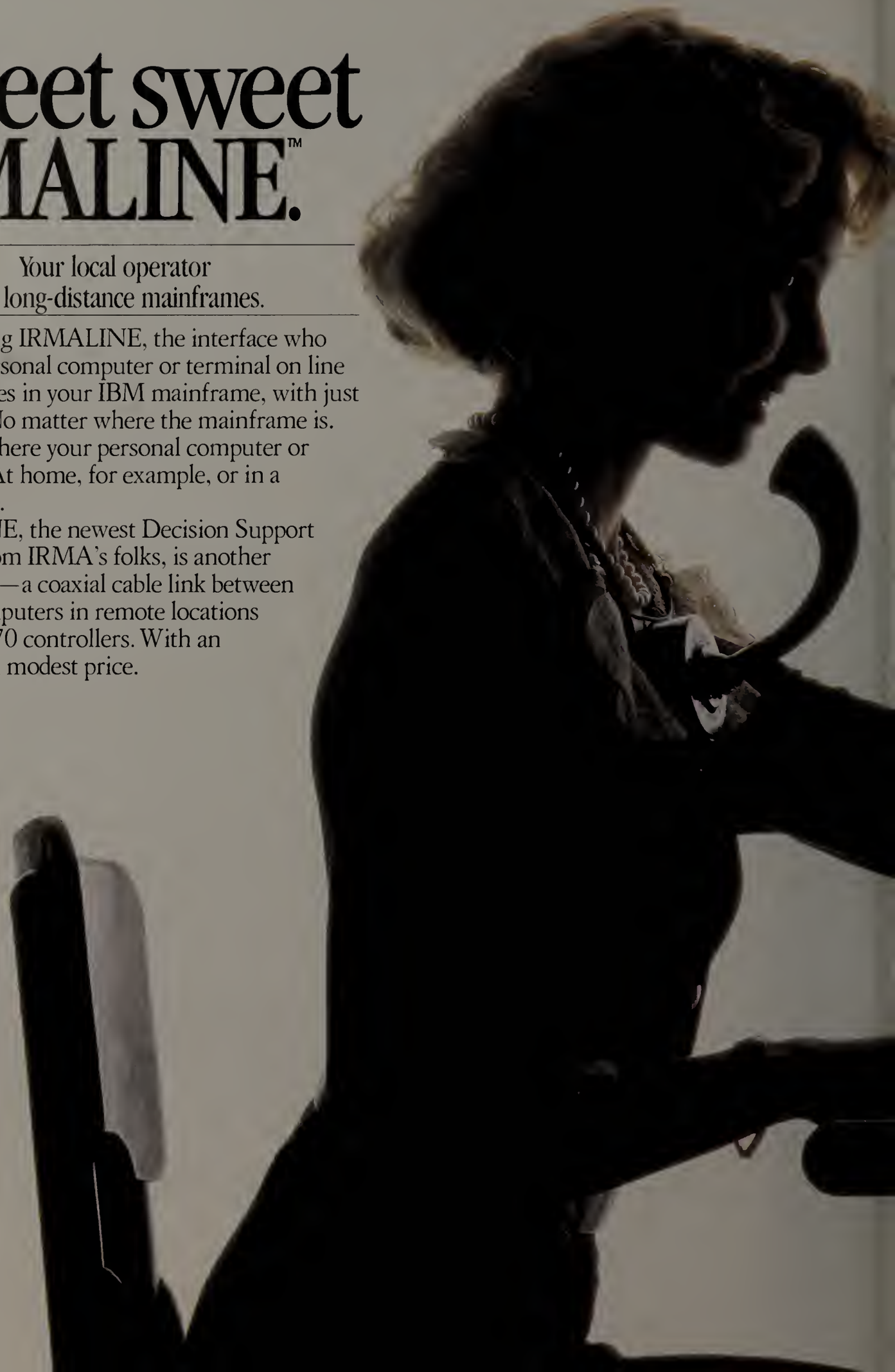
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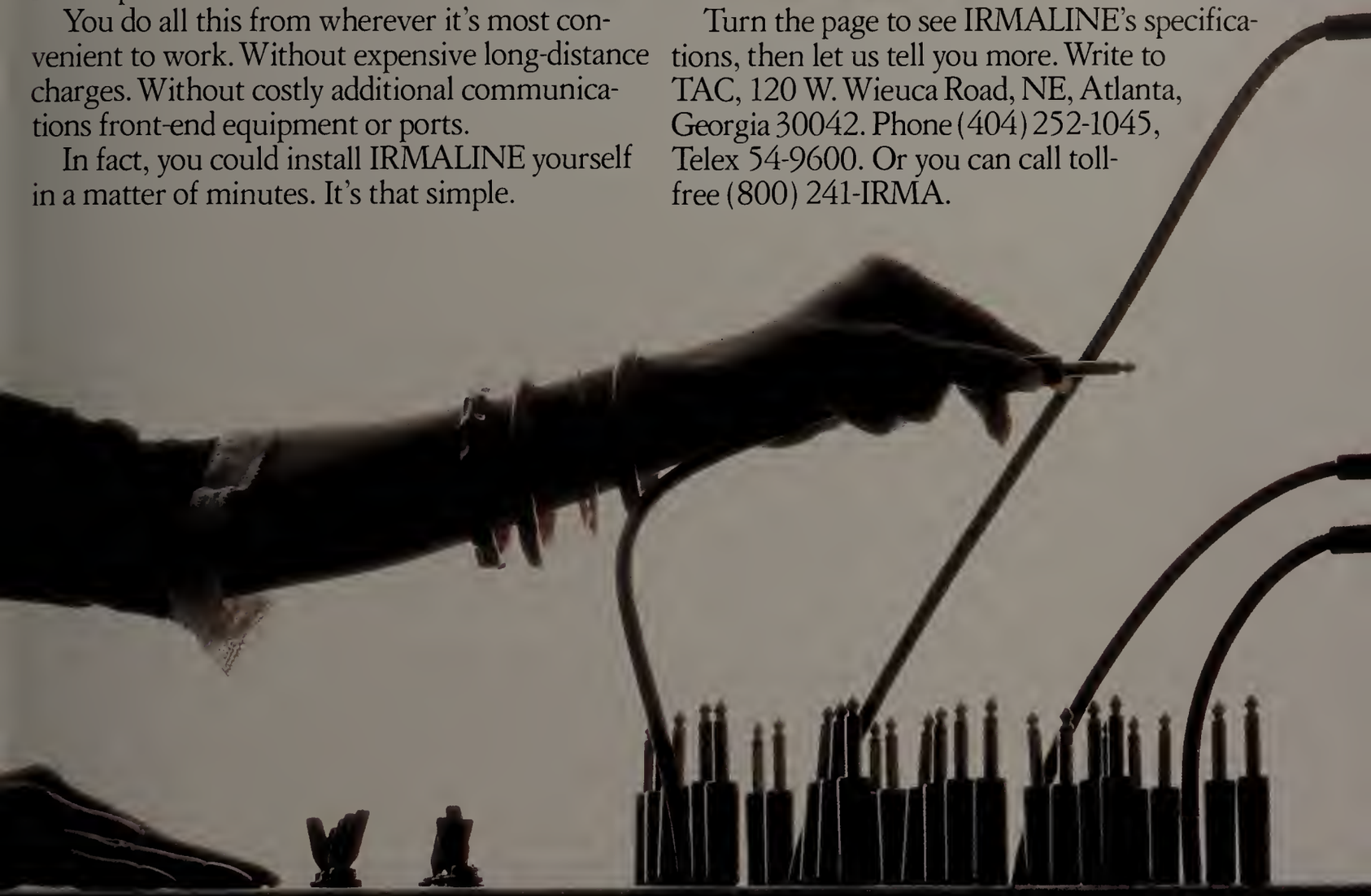
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MADE TO LAST?

IN DEPTH

(Continued from In Depth/22)

tial value of comparisons to these historical records, comparisons which are not possible unless the data is stored in machine-readable form. If a material requirements plan highlights a part in stock with no requirements within the current planning horizon, work must be done to determine the likelihood of future use before the material should be disposed. It becomes a far simpler task if we can see that the part has not been used in any of the past three years.

4. Successful systems are fairly stable because of a flexible original design. The paradox here is that by allowing some flexibility, we are ensuring that the core of the system will remain intact. This flexibility in turn guarantees that the system will be modified rather than scrapped and completely rewritten. The trick is to permit alterations at a reasonable cost. There is a judgment involved in deciding precisely what level of change is too much before the system gives way to a complete new generation.

The single most important design feature that ensures flexibility is record filler. Always allow 10% to 15% filler for future use. Don't fool yourself into thinking that you are the best designer in the world and have thought of everything. If a system remains completely static over several years, then there are probably some enhancements that can be made to make it a more productive tool for the user. Leave some filler because you want the system to progress.

The manufacturing data base and the item master file at Grove Manufacturing have been in existence for 13 years, and we are currently processing a request to add four new data fields to that file. Where do the ideas for system enhancements usually come from? New employees. Employee turnover is a business fact of life, and each new employee brings a fresh perspective to his job. He is generally biased to the extent that he wants to incorporate the best features of the system that he has just left into the system he must now work with.

5. Successful systems are easy to operate. I trust that we can logically conclude that a system which is easy to operate is also efficient. Why then do simple systems succeed more often than complex ones? The answer once again is the ever-present user. If he perceives a system as easy to use, he will use it. If not, he will find all manner of excuse not to use it. "Simple" here does not refer to the level of sophistication in the system but rather to the interface with the user.

The input document in a batch environment can be designed so that it is simple to use. When adding a new record to a file, what data fields are required? Why not shade those fields on the input form to indicate this fact? When processing a change to a quantity, will the amount shown be added to, subtracted from or will it replace the existing file data? Make sure your instructions are clear and consistent throughout all of your systems. That way a user who changes departments will already know the basic rules of the game.

6. Successful systems include extensive front-end edits. There are two issues at stake when designing edits: reliability and user friendliness. Reliability can be ensured by testing for more than the mere presence of numeric data where it is required. Test for ranges of expected values in data fields that have known limits. If you expect pay raises normally to fall between five cents and 15 cents, issue a warning if a raise falls outside that range.

Edits that ensure user friendliness are specific and use the English language, not jargon (especially abbreviated jargon). Use the message "Payment data invalid — correct and resubmit" instead of "Invalid transaction." Use "Warning — rate change exceeds expected limits" instead of "Invalid data." Distinguish between fatal and warning error messages. A fatal error is one in which the entire transaction is rejected and must be resubmitted. A warning applies where the transaction is accepted but some part of the data is suspect. Design edit messages as though a new user will read them each day. If you must err, err by being too long-winded rather than too brief.

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IN DEPTH

The Easy Guide to Successful Systems

The following assessment survey can be used to apply this theory and quickly determine the probability of success for a new system. Try it on existing systems first. Pick one of your systems you think works well. Then fill in the guide to see if it is as good as you believe. Do the same thing with one of your poorer systems. Make your choices on a purely subjective basis at this point. The object of the exercise is to evaluate the effectiveness of the guide. (My systems' scores range from 71 to 31.)

When you are convinced that this guide indeed measures success or failure, apply it to one of your systems currently under development. If the system earns a poor rating, look for areas in which you can improve. Use the guide to reevaluate the probability of success several times during development, each time strengthening the weakest areas.

DIRECTIONS:

1. Pick a system for evaluation.
2. Circle the weighted scores if your system contains that trait. Note: Partial credit may be assigned; for example, if your system does some exception reporting (but not much), you might assign a weight of 4 to that item instead of 8.
3. Add up the circled values to get your total system score.

SCORING:

58 and above — Good system; full speed ahead.

57-40 — Marginal system; definitely room for improvement.

39 and below — Caution; eliminate some weak spots before progressing.

ITEM	WEIGHT
1. Requested by user	
Eventual end user	15
User management above eventual user	10
2. Serve a purpose	
Working detail	5
Management summary	7
Both detail and summary data	5
Design work done by eventual end user	5
3. Use DP strengths	
a. Volume	
High	3
Low	-3
b. Exception reporting	8
c. Sorting	
Multiple sequences	3
d. Calculations	
Numerous	3
Few	1
Job executed frequently	2
e. Data retention	
Less than one month	1
One month to one year	3
More than one year	5
4. Flexible	
10% filler	4
15% filler	7
5. Ease to use	
Easy	8
Fairly easy	4
Hard to use	-5
6. Edits	
a. Reliable	
Always	10
Generally	4
No	-5
b. User-friendly	
Always	8
Sometimes	5
No	-4
7. Not wanted by eventual user	-50
8. Solve temporary problem	-8
9. "Pet" project	-5
10. Overstated savings	
Current project	-5
User has previously overstated savings	-5
11. Understated costs	-5

(Continued from In Depth/20)

ly and come close enough to accommodating Uncle Sam. After all, he may never ask for this information again — and if he does, it will probably be in a different format.

3. Unsuccessful systems are "pet" projects. You must fight long and hard to convince a management-level employee that his idea, although nice, doesn't have enough successful traits to warrant further effort. Probably you have a few pet programs in your libraries that a manager with enough clout had programmed, then ran just once. Fortunately, only upper levels of management have enough power in the organization to implement these projects, a fact severely limiting the requests approved without valid justification.

It is a sad fact of business life that some egomaniacal managers defend their position with title instead of logic. You can bet that when they leave your organization, their pet projects will be quickly assigned to the scrap heap by their successor.

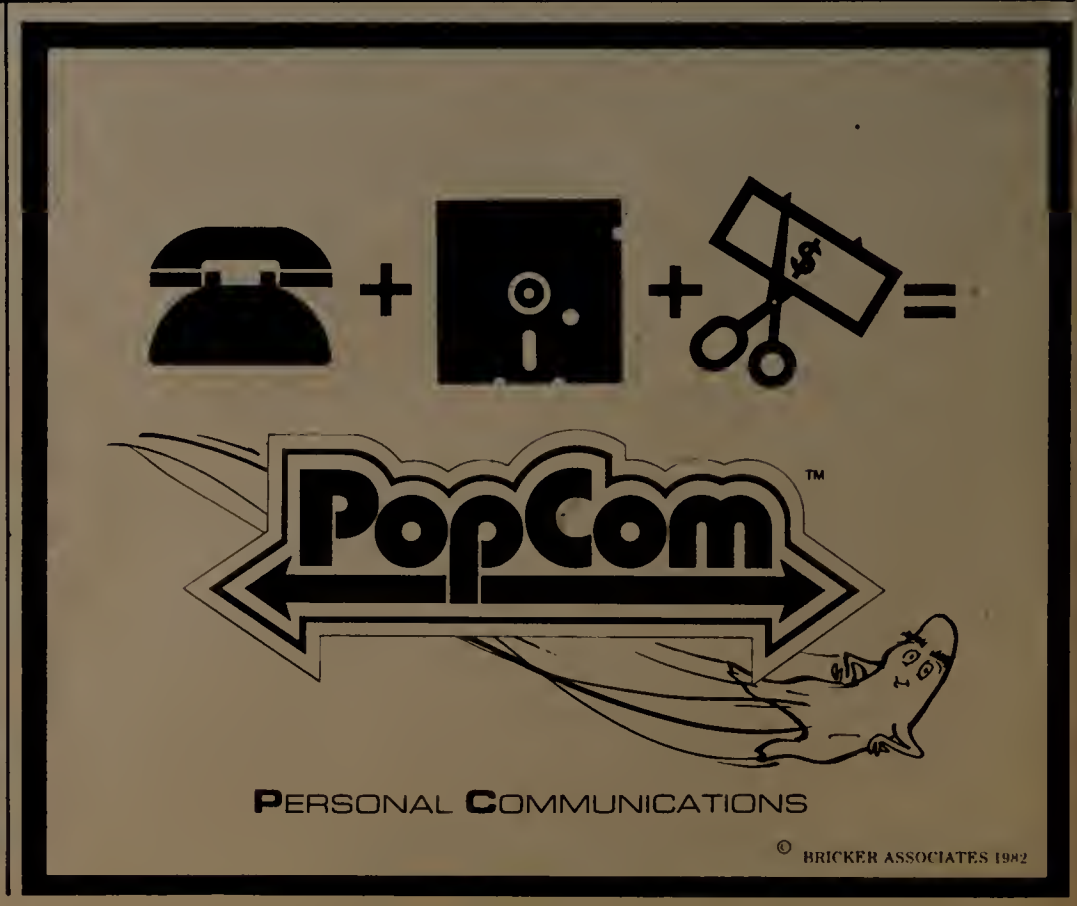
4. Unsuccessful systems overstate potential savings. Disappointment at not realizing stated objectives can turn off users and render a system inoperable. Make sure that the planned savings are realistic before a project is started. Suppose that the customer service staff anticipates a new parts-ordering system with the promise that it will make its job easier, reduce inventory by 40% and improve turnaround of shipments to 12 hours maximum 98% of the time. After installation, if inventory is down 15% and shipments now average 24 hours 90% of the time, who will remember that his job is easier? Most everyone will still be striving to reach for an unattainable "carrot."

Also ensure that savings are monitored after project completion so you can build a history on users who

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MADE TO LAST?

IN DEPTH

have a tendency to exaggerate expected benefits when they are proposing new systems.

5. Unsuccessful systems understate development time and cost estimates. This point is the corollary to failure trait number four, but in this case you are responsible for the problem, not the user. As time wears on and schedule deadlines pass, user interest drains rapidly. As costs increase, management interest heightens dramatically. So estimate carefully with the understanding that your estimate comes under increasing scrutiny as the projected deadline nears.

Two major contributing factors to missed schedule dates are system design changes before implementation and changes in task priorities during the course of development. These factors, however, will not be perceived as poor estimates if they are administered properly.

Systems will change — you want them to. Change is concrete evidence of user interest and need. Don't expect to freeze a system design at any stage of a project, but do keep the user informed of what any proposed alteration will cost in terms of time and money. Have him participate in the decision-making process and let him control his own destiny to that extent. A simple reply such as "Fred, I've looked over your request, and we can deliver as promised on June 1 or we can make the change and deliver on July 15. Which way do you want it?" If he elects to make the change, then document it that way.

Be aware of the difference between a bad system and a disastrous one. A bad system lacks a number of the success traits but includes enough usefulness to limp along and survive, although with much criticism. A disastrous system can be cheaper in the long run because the multitude of bad traits kills it quickly. The system is either rewritten or forgotten.

Don't be afraid to bite the bullet and kill a bad system. You won't be popular for adding another item to the DP backlog, but the "going concern" concept in business mandates that deadwood be weeded out for the good of the business in the long run.

About the Author

Jack O'Connor manages the data processing department of Grove Manufacturing Co.'s Conway, S.C., division. During his 12 years in DP, he has worked with manufacturing control systems, materials resource planning and inventory systems.

O'Connor holds a B.S. in mathematics from Towson State University in Baltimore.

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IN DEPTH

Nurturing Your Own Productivity



By Irv Brownstein
And Nancy Lerner

Historically, companies call for evaluations, reviews and audits of the management information systems department only under the influence of external pressure — after an internal audit, in the face of excessive turnover or when complaints grow loud enough. In these cases, it is already too late to reverse the perceptions of management throughout the organization. What remains at worst is the belief that the MIS department is out of control. At best, the function is viewed as reactive and slow.

Instead, MIS should take a proactive approach to address and solve any prevailing problems before they generate external pressure.

Unfortunately, rare is the MIS organization that will turn loose its array of analysts and technical specialists on its own problems. These experts are considered useful only in terms of their role in helping users develop new automated application systems. They are allowed to freely recommend modifications to the users' work flows, practices, forms and procedures.

Well, what of the MIS department's glass house? Shouldn't productivity improvements be as inte-

IN DEPTH

gral to its charter as supporting user departments? Why not commit top MIS talent to evaluate the MIS function and facilities between assignments to new systems? By instituting an internal review process to optimize productivity, the department can start practicing what it preaches to users.

A productivity optimization review should be an ongoing process with two parts: a systematic initial analysis to improve the overall cost effectiveness of the information processing function; and brief, yet rigorous follow-up sessions conducted on a periodic basis to ensure continued productivity improvement.

The review will usually result in recommendations for improving service and cost/performance. It will then allow MIS management to act under control with knowledge and confidence, rather than simply reacting to criticism and pressure. The review will provide an evaluation of the strengths and weaknesses of the function, recommendations for immediate productivity gains and a continuing service that can direct future productivity improvements cost-effectively. It will also furnish a basis for comparison with the information industry in general, as well as specific trends within the organization.

Perhaps more important, it will demonstrate the department's willingness to question whether its own house is in order. This may well lead to greater respect for MIS management and its practices, along with increased acceptance of the function throughout the organization.

Don't misunderstand. The process of conducting the review and acting on it requires time, choice MIS talent and significant management involvement. But the results can do as much to improve MIS' operations and organizationwide reputation as the best system developed.

How Is It Accomplished?

A productivity optimization review is an analytic process based upon gathering information from a host of sources. The data collection process can be performed in three ways:

Direct interviews with selected representatives from executive, user and MIS staff (supplemented with questionnaires as necessary).

Inspections and observations of the work processes in the areas under study.

Document reviews conducted on a sampling basis.

The review is conducted in eight major steps:

1. Identify and evaluate the process workflows. The workflow analysis is identical in concept to the kind of analysis performed in user areas when application systems are designed — it is aimed at identifying bottlenecks and delays.

Don't feel limited to using any particular technique for performing the analysis. The important thing is to ask these questions:

What tasks are being performed at each workstation?

Are there too many pieces of paper involved in the work-in-process? Do they contain redundant information? Does each document communicate necessary information?

Are there processing deadlines for certain documents? Does the current workflow allow for processing documents in a priority fashion?

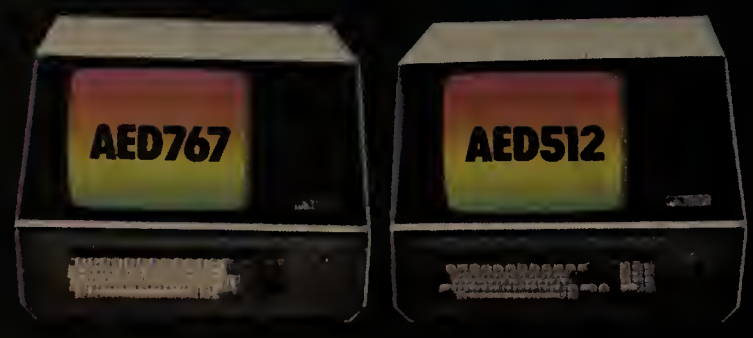
Can requests for new development, maintenance, equipment, personnel, software and problem resolution enter the department from multiple points? If so, what does the approval, work initiation and completion process look like? Does it lead to unnecessary delays? When work assignments are made, do the right people end up doing the work?

Is the department separated into meaningful groups? How effectively does the department's structure respond to changes in the corporation's evolving business strategy and priorities?

What does it take to get something approved? Who can sign for what? Is there a discrepancy between the nature of the item being requested and the levels of approval needed? Are the approval levels constantly scaled to current realities? In other words, are issues such as current software prices, salaries and equipment costs taken into account when approval

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NURTURING PRODUCTIVITY

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levels are established?

What are the control points in the workflow? At what points is work validated? Are work requests checked out after a specified length of time? How and to whom are control reports sent?

Perform the workflow analysis in these key areas: development, maintenance and production. Initially, diagram each of the work processes within the department. This step will highlight paper, document and data flows, as well as physical traffic patterns throughout the operations under review.

2. Examine the physical environment. The analysis of the workflows, combined now with a review of the physical setting, should reveal productivity bottlenecks. Using blueprints or physical layouts of the department, map the workflows against the physical location of workstations.

Are there situations where distance or lack of access cause workflow problems?

Is space allocated properly within the department? Are people requiring quiet space to work too crowded or in a noisy area? Are printers and copy machines easily available? Is equipment kept running smoothly? Are repairs performed promptly? (These control issues should have surfaced in the workflow analysis.)

'There are numerous software packages and aids available to boost productivity, but does the staff use them? Have you identified the most common errors in program development?'

Are a sufficient number of terminals available for testing and production? If the staff is spending considerable time in transit to distant "open" terminals, additional terminals can usually be justified on an economic basis. (Often minicomputer environments are more productive because of the high ratio of terminals to staff.)

How are testing printouts (where required) distributed? For instance, if the staff is spending a lot of time obtaining necessary printouts, then an on-line development tool may be only partially productive.

Does the data center maintain adequate library storage facilities on premises? Is there a library facility for archiving program listings, reference materials and so on? Is it readily accessible? Is the material kept current? By whom?

3. Investigate the planning function. The project and systems planning mechanisms used in a DP shop are critical to effective performance. Identify the forms of measurement that are currently used as a basis for analyzing and identifying areas for improvement.

Does the organization have estimating guidelines that reflect historical development in the shop with an eye toward industrywide average estimates? These guidelines are often the key to successful long-range planning and evaluating.

Other factors to look for are the following:

Are walk-through reviews used on all projects or are they applied selectively? How long do they take? Are there any controls on how long they take? Who is involved? Do they improve the products reviewed?

Are automated and/or manual techniques used in project status reporting?

How are priorities established for both development and maintenance projects?

Is assignment of personnel within the department based on corporate guidelines? Are the best people allocated to the most important projects?

Is the status reporting process designed to capture chargeback information, schedule adherence or to pinpoint potential problems? How much time per person is required to submit status information? Is the status reporting process relevant? Does it allow for providing information on critical activities? Is a considerable amount of staff time lost in reporting insignificant or static information?

Is there an official authorization procedure to go from development to production? Are costs and time separated? Does work scheduled for production always get there?

4. Evaluate the systems development area. Standards and guidelines are available. Consider:

- Project life-cycle concepts — Are they available? Are they used? Do they reflect the technologies employed in automation activities?
- In-house development techniques and aids — Are they available? Do people know about them? How? Are they used?
- Structured techniques — Are structured analysis, design and programming available? Are they used? Should they be?
- Code generators, skeleton programs, reusable code, high-level languages, test data generators, on-line development mechanisms, data base and data dictionary systems — Are they available and used?
- Productivity determination and evaluation methods — Are there methods for determining and evaluating productivity? What are they? Do they work? Do they reflect the technologies the department uses?
- Documentation — What are the

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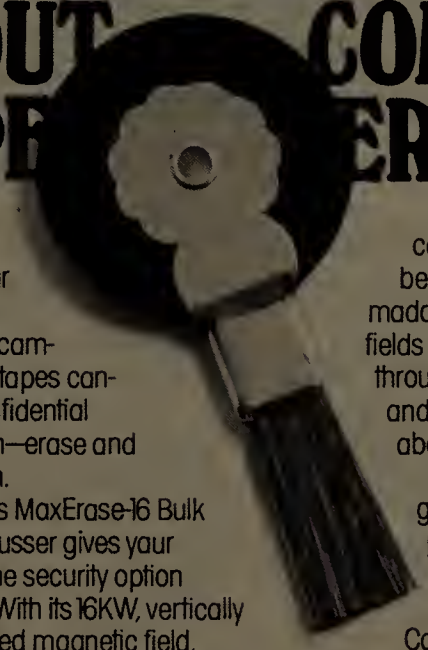
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documentation requirements within the department? Do they reflect the system development life cycle? Are they adequate? Is the documentation actually developed? For which projects?

- Training — Is there internal training for departmental practices and technologies? Who conducts it? How often? Who attends?
- Auditing — How is the auditing department involved in development activities?

Can you produce code that is technically correct, as well as efficient and maintainable? There are numerous software packages and aids available to boost productivity, but does the staff use them? Have the most common and frequent errors in program development been identified? Do you know the patterns of usage of your technical aids?

5. Review the maintenance function. Look at the entire area to determine whether it is treated as a lower level priority within the department. If the function is dealt with as a "second-class citizen," chances are less attention is paid to maintenance activities and the work is of lower quality.

Does maintenance receive the kind of attention afforded to development? For example, is there a methodology that sets forth priorities and procedures? Are costs and time spent estimated and controlled? Are productivity tools readily available? Are the "real" and "total" costs truly charged back to the user, or is the user held accountable only for machine time?

More questions to answer are:

What is the acceptance process for systems from development? Is there a formal turnover procedure? Of what?

How is the auditing department involved in maintenance activities?

Are there methods and techniques for determining productivity? Do they work? Do they reflect the current technologies employed in the department?

Are there any automated environment/development tools available for maintenance requests? Are they used?

What is the status of documentation for systems in maintenance? Are the changes kept up to date? Is the documentation complete? Is it accurate?

Do you look to optimize systems once they are in maintenance?

The Final Product

Based on the analysis, prepare a productivity evaluation report. In this report, evaluate findings by each work function under investigation in relation to itself as well as to the overall organization structure, objectives and plans.

Summarize productivity improvements by type and incorporate them into a suggested productivity plan, based upon their priority, resource requirements and probably impact. In each case, alternative approaches must be weighed, costed and analyzed.

Following is a suggested table of contents for the productivity evaluation report:

Executive Summary
General Description
— Background
— Scope and Objectives
Productivity Assessment: Workflow Processes
Productivity Assessment: Physical Environment
Productivity Assessment: Functions
— Planning Function
— Systems Development Area(s)
— Maintenance Function
— Production Environment
Summary and Conclusions
Comparison to Prior Period (if appropriate)
— Open Items
— Resolution
Productivity Plan
— Alternatives
— Recommendations

6. Assess the production environment. Are any of the data center procedures automated? Why not? Often, more time and effort are wasted in the hand-off from development to operations and maintenance than are spent determining user requirements.

Does the production facility know what it wants and when? Does anybody else? Are these needs actually necessary to operate and manage the function? Or, are they carryover procedures that reflect older equipment and technology?

For each data center facility, as well as the overall production function, consider:

- Are there any work-in-process systems such as job submission and problem reporting? Are they automated? If not, why?
- What reporting mechanisms are used to communicate service level as well as problems or changes? How frequently? To whom?
- Is the tape library efficiently organized and maintained? Are there enough or too many application backup or scratch tapes? Is automation used? If so, with what results?
- How is the direct-access storage device (Dasd) space managed? Is there sufficient testing space? How often are programmer files reviewed and released? What happens to space used by former employees and obsolete systems? Is it recovered?
- What is the acceptance (or turnover) process for new systems maintenance and enhancements? Does it conform to the project life cycle? Are the requirements documented and current? Does everything that is required have a purpose? Are the time frames associated with the process known and reasonable?
- Are the equipment and software monitored for utilization and efficiency? Who knows about it? Does management get summary or detailed information? Is it part of service-level reporting to users?
- Are there specific procedures or facilities for using the testing environment? Are these requirements documented and current? Are they reasonable and efficient?
- Is technical support offered to troubleshoot problems in the development or maintenance functions? How is it arranged? Are there some common problems that should be part of training or communicated to all of the staff? Are they?

7. Evaluate the quality assurance efforts. It is one thing to have standards that sit on the shelf to satisfy an earlier audit exception. But are these standards readily available to the staff? Do they have any "teeth" in them? Are systems and programs spot-checked to determine compliance with standards? What do you do when they fail?

Determine if standards and procedures exist. Do they cover the technologies and processes of the department? Are they current, complete and correct? How are they made available to the staff? Are they used? Are the standards and procedures part of the training program?

Is there a quality control program to verify adherence to project life-cycle and department standards?

8. Identify improvements and recommendations. You can now analyze the information gathered to this point to determine any bottlenecks to productivity, alternatives to solve the problems, the cost to implement each alternative and the impact on environment and personnel.

Then What?

To continue to benefit from the original review, conduct follow-ups on a semiannual or yearly basis. Review the productivity plan on a plan-vs.-actual basis.

Analyze productivity gains within the organization to ensure continuous productivity improvement. Use techniques such as trend analysis and industrywide comparison. "Revisit" critical bottlenecks to determine their current status and effect on the workflow. Review and analyze results from programs initiated in the prior period for utility and positive productivity impact.

Prepare a summary of these efforts for executive management awareness and evaluation.

About the Authors

Irv Brownstein is president of The Productivity Group, Inc. (TPG), a New York consulting firm specializing in quality assurance techniques. A graduate of Rutgers University, he has 16 years' DP experience in consulting and corporate environments.

Nancy Lerner, vice-president of TPG, specializes in writing, marketing and development of methodologies. She holds a bachelor's degree from Barnard College, Columbia University.

Brownstein and Lerner recently collaborated on a book titled Guidelines for Evaluating and Selecting Software Packages, *published by Elsevier Science Publishing Co.*

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SPECIAL REPORT

Computer-Based Manufacturing Systems: Making the Right Moves



Edited by Bruce Hoard and Patricia Keefe

April 25, 1983

COMPUTERWORLD
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DP Manager to Play Key Role

Integration Hallmark of 'Factory of the Future'

By Charles S. Skinner,
Robert P. Burrows
And Ralph L. Dratch
Special to CW‡

Is the "factory of the future" really the ultimate, totally automated, manless and paperless operation that some proponents envision?

Probably not, except in isolated cases. All manufacturing functions are not equally suited to computer automation, and highly skilled managers will be vitally needed to assess automation trade-offs and facilitate integration among manufacturing functions.

The factory of the future will differ significantly from today's factory through increased use of computer-aided automation. More importantly, it will be distinguished through its use of automated information systems as linkages — providing a high level of integration and ensuring highly effective scheduling and control of manufacturing activities.

Information will be stored in a closely linked, shared data base rather than scattered throughout the plant in isolated data bases of both the automated and manual variety. This close sharing will translate into a demanding, key role for the data processing executive who, perhaps more than anyone else, has the opportunity to be the integrator in the factory of the future.

The factory of the future will see increased batch automation in the form of robotics, computer-aided devices and shop floor control systems. Most importantly, it will see integrated functions and factorywide information exchange.

In the factory of the future, virtually all direct manufacturing and supporting functions will be integrated. It is this integration of functions that will truly distinguish tomorrow's factory of the future and account for its improved efficiency.

With data available at vital points — where it can be cross-referenced for accuracy and will be easy to use — manufacturing functions can be directly responsive to change and managers can carefully balance the conflicting objectives of other areas such as design, engineering, inventory control and distribution.

Numerous computer applications are revolutionizing manufacturing. These include new, more sophisticated numerical-control machine tools, robotics, computer-aided devices, shop floor control systems (such as computer-aided testing, logistics and process planning) and fully integrated flexible manufacturing systems.

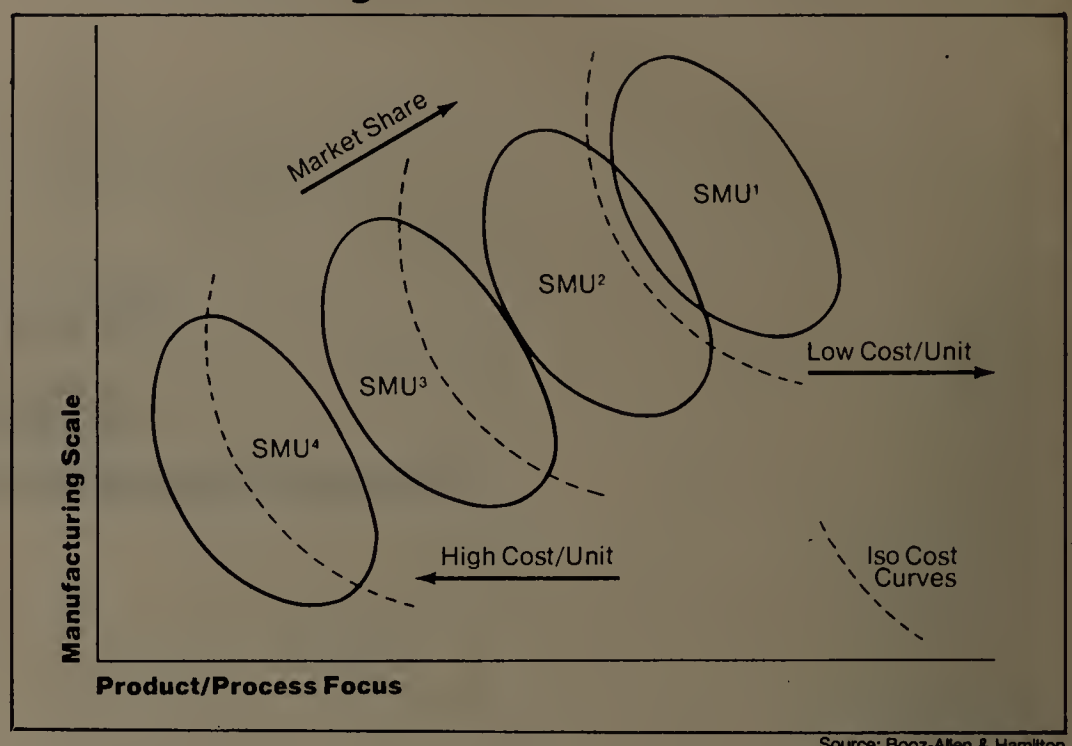
It is not enough, however, to fill a factory with the latest technology. The key is to know the appropriate technologies and the degree of automation required to yield the highest productivity and product quality and the best return on investment.

To facilitate these judgments, one can look at industry as a series of strategic manufacturing units (referred to in Figures 1 and 2 as SMU). Strategic manufacturing units group products and/or components according to their manufacturing scale (volume output per plant per year) and their focus (process, market and product characteristics) in order to determine appropriate technologies, strategies and plans (see Figure 1).

Typically, SMU 1 represents a high-volume, highly focused product that is relatively stable and mature. SMU 2 represents a lower volume, less focused product group; SMU 3 is a highly dynamic, diverse product group characterized by lower product volume and many customized features; and SMU 4 represents a very small-volume, diffused product group — basically a job shop.

Strategic manufacturing unit

(Continued on SR/8)



Source: Booz-Allen & Hamilton

Figure 1. Manufacturing Model for Product/Process Innovation Level

A Group of Applications In Search of the Right Definition

MRP is one of the hottest new topics in the world of computers, particularly in the area of manufacturing. However, readers will find that MRP means different things to different authors. For some, it translates into "materials resource planning"; for others, it translates into "materials requirements planning," "manufacturing requirements planning" or "manufacturing resource planning."

It is not surprising that at least four different translations of MRP exist — the field of computers in manufacturing is an area in transition. Rather than impose an arbitrary definition of MRP on the authors, the editors of this Special Report decided to let each article present its own case.

Inside

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Factory Automation Equipment Mart Booming

By Ralph P. Finos
Special to CW‡

Shipment value of factory automation equipment by U.S. suppliers reached $8,990 billion in 1982 and promises to grow at a 23% annual compounded growth rate until it reaches $22,564 billion in 1986.

Spearheading market growth will be industrial robots, computer-aided engineering (CAE) and computer-aided design (CAD) systems and software, manufacturing control systems (MCS) and software, manufacturing resource planning (MRP) and programmable controllers.

In addition, emerging growth sectors of the factory automation market are likely to include inspection systems, automated assembly, flexible manufacturing systems, robot and manufacturing control languages that will facilitate the programming of automated equipment and systems and hierarchical machine and manufacturing process control networks.

Factory automation is the application of programmable electronic and/or computer-based systems to the operation and control of manufacturing and manufacturing-related activities. These activities include engineering analysis, design, manufacturing, manufacturing control systems and manufacturing information systems.

The factory automation market is a very disparate one with largely isolated segments (see table). The segments include:

- **CAE.** Structural analysis and simulation software.
- **CAD.** Design and drafting systems and software.
- **MCS.** Systems and software that are used for the monitoring and analysis of manufacturing processes (MRP systems).
- **Factory Data Collection.** Online shop floor data gathering systems.
- **Data Acquisition.** High-speed process monitoring.
- **Numerical Control Tape Preparation.** Parts programming software and systems.
- **Automatic Test Equipment (ATE).** Integrated and printed-circuit testing equipment.
- **Process Control.** Continuous process monitoring and control systems.
- **Computer Numerical Controllers.** Controllers for machine tools.
- **Programmable Controllers.** General-purpose, relatively simple machine and process control.
- **Numerical Control Machine Tools.** Metal cutting and forming machines.
- **Automated Material Handling.** Automated warehouse equipment for storage and retrieval of inventory.
- **Intelligent Robots.** Intelligent manual manipulators.

Market Segments Expanding

Currently, suppliers in one market rarely participate in another, owing to the specific application specialties that are so often required for success. Some companies are breaking this mold, however. Scenarios that have IBM competing with General Electric Co. and Digital Equipment Corp. competing with Allen Bradley are increasing in likelihood as previously isolated segments of the engineering and manufacturing process draw closer together.

There is likely to be an uncomfortable collision in the market between companies with currently complementary products who may sometimes find they are competing with one another at various interface points. Factory floor savvy vs. the potential of computer power and intelligence should prove to be the sticking point.

U.S. computer industry suppliers are hurrying to make their presence felt in the factory automation market. Today, they generally provide computer systems with third-party solutions to CAE, CAD and MCS problems. Since the minicomputer has often been the system of choice among engineers, it is not surprising to see minicomputer suppliers lining up to get a foot in the door.

The strength of these suppliers lies in the acceptance of minicomputers and generic computer capabilities

(Continued on SR/4)

1982 FACTORY AUTOMATION SYSTEMS

	Total Shipment Value	Percent of Market
Computer-Aided Engineering	$ 535	6%
Computer-Aided Design and Manufacturing	1,675	19
Manufacturing Control Systems	1,815	20
Factory Data Collection	310	3
Data Acquisition	450	5
Numerical Control Tape Preparation	80	1
Automatic Test Equipment	850	9
Process Control	875	10
Computer Numerical Controllers	250	3
Programmable Controllers	325	4
Numerical Control Machine Tools	1,150	13
Material Handling	475	5
Robots	200	2
Total	$8,990 Million	

1986 FACTORY AUTOMATION SYSTEMS

	Total Shipment Value	Percent of Market
Computer-Aided Engineering	$ 1,550	7%
Computer-Aided Design and Manufacturing	5,400	24
Manufacturing Control Systems	6,025	7
Factory Data Collection	625	3
Data Acquisition	775	3
Numerical Control Tape Preparation	275	1
Automatic Test Equipment	2,075	9
Process Control	1,190	5
Computer Numerical Controllers	475	2
Programmable Controllers	900	4
Numerical Control Machine Tools	1,875	8
Material Handling	825	4
Robots	575	3
Total	$22,564 Million	
Annually Compounded Growth Rate		24%

MRP Software Packages Bring Cost of MRP in Reach

By David Meyer
Special to CW‡

Until recently, few companies with less than $10 million in annual sales could afford to computerize their manufacturing and inventory control operations.

Companies wishing to do so were confronted with an outlay that could easily run into hundreds of thousands of dollars for a powerful mainframe or minicomputer, sophisticated materials resource planning (MRP) software and salaries for expert data processing personnel.

MRP software packages designed to run on the latest generation of microcomputers, however, have brought the cost of a full-function MRP system well within the reach of many firms.

A number of microcomputer-based packages are now on the market that offer most MRP capabilities afforded by larger computers for increasing labor and machine productivity, improving customer service, reducing inventory investment and gaining greater control of manufacturing operations.

If your company is in the market for an MRP package, there are several key issues that you must consider:

- Functional Capabilities. A full-function micro-based MRP package offers all the essential data, planning and control capabilities found on larger systems by providing modules for bill of materials, inventory control, master scheduling, material requirements planning, purchasing and shop floor control.

You need to determine not only which of these modules is currently required, but also which ones will be needed in the future. Choose a package that will allow you to add modules incrementally; for those packages with the necessary modules, carefully evaluate the capabilities of each module.

- Expandability. To be certain the package you buy will keep pace with your company's growth, you should not only determine the number of parts, bill of materials relationships and vendor records you now have, but also the number you will have in several years. The package must be able to accommodate them. Hardware is also a factor. If you expect growth, you should buy either a multiuser or networking system.

'Even while you are evaluating the various MRP packages, you can take steps to hasten the day the chosen package actually begins effectively performing its functions.'

- Integration of Modules. A fully integrated, "closed-loop" package provides extensive feedback among a complete set of modules so that a transaction in one module will automatically update other modules as required. In a nonintegrated package, you must make numerous redundant entries in various modules.
- Processing Speed. Batch and interactive processing time depend on both the microcomputer and the efficiency of the package's code. An 8-bit machine will be adequate for only the most rudimentary MRP applications. Even among MRP packages running on 16-bit machines, however, average interactive responses take from one-half second to four seconds, and batch processing can range from two to eight hours. Examine each package's benchmarks closely.
- Levels of Detail. MRP packages can be classified either as "bucket" or "bucketless" systems. The type you choose will largely depend upon your requirements for detail in the master scheduling and material requirements planning modules. A bucket system storing data in fixed-period time buckets cannot provide the sophisticated planning capabilities of a bucketless system, which gives not only detailed but also summarized data.
- Ease of Use. By allowing you to select entries from options displayed on the terminal screen, a menu-driven package offers a faster, more efficient interface than a prompt-oriented package and is easier to learn than a command-driven package.
- Responsive Technical Support. A number of vendors are capable of providing extensive on-site consulting and support, but at the very least a vendor should offer a toll-free technical support hot line number. Not

(Continued on SR/6)

Industrial Robots Spearheading Market Growth

(Continued from SR/3)

such as a range of processors, data base management systems and communications and networking — all important requirements for computer-integrated manufacturing in the future. The ability of these companies to provide multiapplication solutions in office systems, engineering analysis, CAD/CAM, MRP and project management gives them a decided edge over more narrowly application-focused companies in this marketplace.

IBM, DEC, Prime Computer, Inc., Data General Corp. (DG) and Perkin-Elmer Corp. have all built a focused CAD/CAM marketing effort or business unit. Gould/SEL, a division of Gould, Inc., Harris Corp. and Hewlett-Packard Co. (with its 32-bit desktop engineering workstation) have also brought CAE/CAD/CAM capabilities to market in the past year or two.

DEC sells hardware with third-party software (which it may joint market) to its very large engineering installed base. Recent announcements by DG indicate a similar strategy. Prime has embraced Medusa CAD/CAM software for exclusive marketing and has recently acquired CAD/CAM software supplier Compeda, Inc. — the CAD business group — becoming, in effect, a CAD/CAM company. PE has marketed its own turnkey system for a few years and is looking to make its equipment attractive to third-party software suppliers.

Top Supplier Position

DEC has had to struggle with its position as the preeminent supplier of processors to CAD/CAM system OEMs — perhaps preventing it from embracing a single CAD/CAM software. While CAD/CAM system suppliers are broadening their processor base (Calma Co. uses DG, DEC and Apollo Computer, Inc.; Auto-Trol Technology Corp. uses Sperry Corp., DEC and Apollo), no other minicomputer supplier is likely to have similar conflicts.

HP continues its CAE emphasis with its desktop engineering workstation, the HP 9000. The engineering emphasis of the company is a decided edge in the factory automation market. Placing the HP 9000 workstations in a network with other factory automation equipment seems to be HP's strategy.

The factory automation market also includes CAD system and software suppliers Computervision Corp., IBM, GE/Calma, Applicon, Inc., Auto-Trol Technology Corp., Intergraph Corp., McDonnell Douglas Automation Co. (McAuto) and scores of start-up companies.

The availability of independent software — much of it from Europe — for geometric modeling (especially important for mechanical CAD/CAM) is also being taken seriously in the U.S. for perhaps the first time.

The semiconductor industry has been slowly penetrating manufacturing equipment and the factory floor from sensors to control logic. The need to control this growing machine-level intelligence is a natural place for the penetration of computer software and hardware. Large Fortune 100 industrial companies (especially high-technology companies) have been the leaders in implementing advanced manufacturing control technologies.

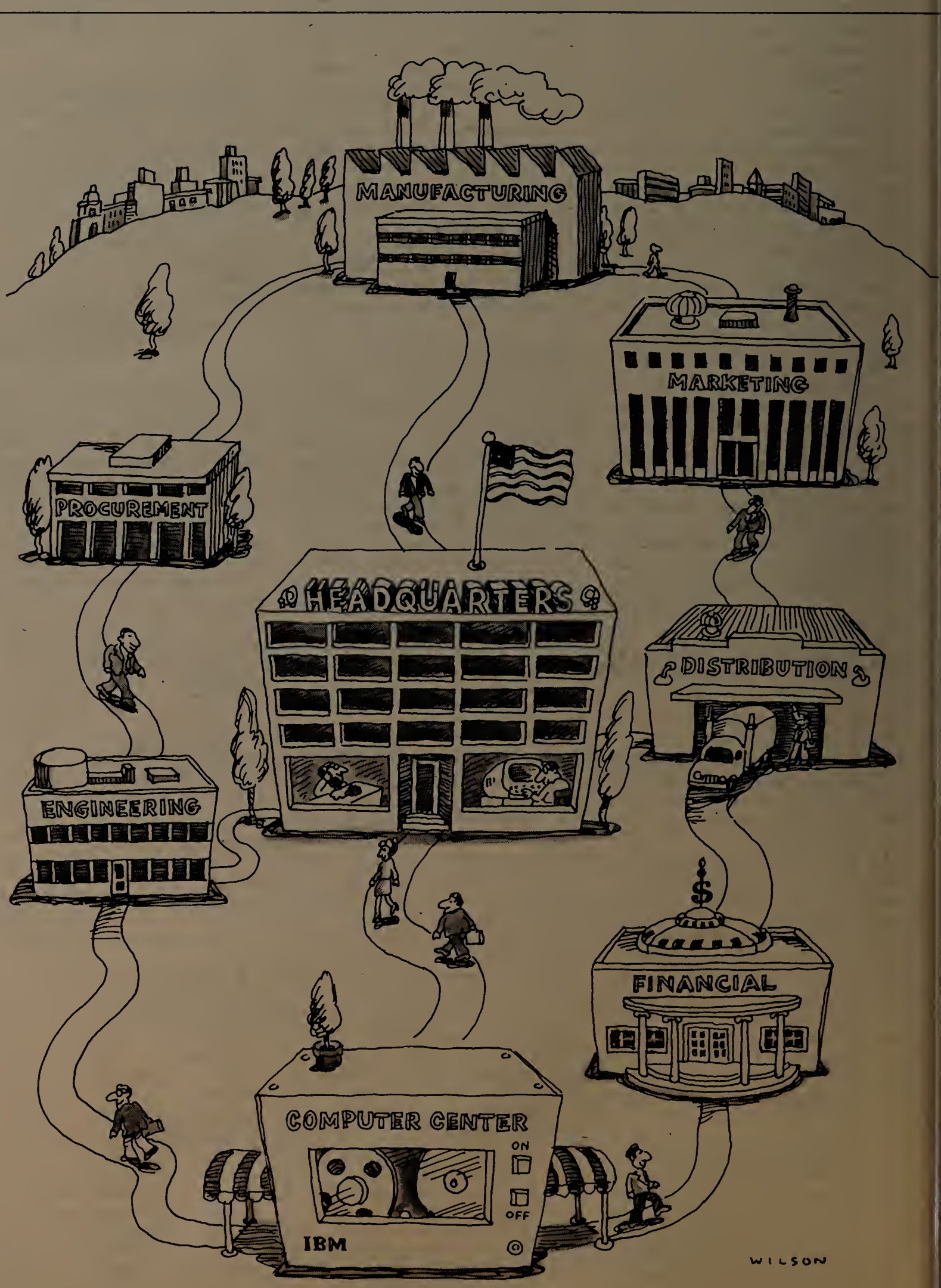
These advanced end users have also brought products to the marketplace — arising out of their need to solve problems that current suppliers could not solve for them. Their commitment to the technology of factory automation as part of their own mainline business is a major selling point for them. GE, Westinghouse Corp., McAuto and IBM need factory automation to prosper and are leaders in developing solutions.

GE has robots, programmable controllers, chips (Intersil Systems, Inc.), GE/Calma CAD/CAM systems, CAE International for engineering software marketing, a network of time-sharing productivity centers (General Electric Information Services Co.) and its Optomation Vision System, which can perform visual inspection via image processing and pattern recognition. GE has also invested heavily in microelectronics.

The dark side of automation — factory floor control — remains in the hands of suppliers of industrial equipment. Programmable controller leaders Gould/Modicon and Allen Bradley have dominated this market for the past decade, although as many as 35 companies are now participants.

Manufacturing is also more solution-oriented than tool-oriented and often requires specialized equipment and approaches. As a result, the computer industry has largely left industrial automation to the industrial automation companies.

Finos is a consultant with International Data Corp., located in Framingham, Mass.



First Step to Improving Productivity

A Closer Look at Distribution Resource Planning

By Thomas W. Moldauer
Special to CW‡

In the evolution of information processing, there are two basic ways to make use of the computer. The first, and by far the most prevalent, is recordkeeping. A computer is used to accept, compute and store information and to provide selected information for decision making.

The second use of the computer is called decision support. This encompasses learning how to teach the computer to make basic decisions, simulate varied situations and suggest courses of action.

Most business decision support systems (DSS) in use today were designed to support financial management of the corporation. They deal with manipulation of base financial figures for the purpose of optimizing investments and earnings. Opportunities to use decision support tools in areas that can improve the profit inherent in those base financial figures are just beginning to be explored.

Distribution resource planning (DRP) and manufacturing resource planning (MRP) are emerging as essential decision support tools for management of the operating end of the business.

DRP and MRP support the processes that actually produce most corporate revenues: sales, marketing, distribution and manufacturing. And know it or not, your company will be using these decision support tools within the next five years.

Consider this question: How will I compete with manufacturing and distribution companies that are using these tools to cut their inventory, manufacturing setup, transportation, warehousing and direct labor costs by 10% to 20% while improving their customer service level and market response time?

You are likely to be familiar with MRP already. You are equally likely to be wondering just what DRP is. It is a computer-based decision support technique for the management of the entire distribution function and for the statement of accurate manufacturing requirements via the master production schedule.

DRP uses many of the same techniques as MRP — time-phased computation of stocking requirements, netting of common requirements and unit of measure conversion — and applies them to the distribution function. And a good DRP system actually suggests the proper distribution, purchasing and manufacturing actions to take.

Companies engaged in both manufacturing and distribution that use MRP, but not DRP, are solving only half of the profitability and productivity problem. They are producing and purchasing more efficiently, but without a complete understanding of the distribution structure's true requirements.

Providing the Link

DRP provides the link between MRP and the distribution structure. It provides MRP with the best possible input to the master production scheduling process, one that is predicated upon the netted, time-phased requirements of the entire distribution network.

The introduction of DRP is the first step to improving productivity in a manufacturing and distribution company. The second step would be to implement MRP to improve the productivity and efficiency of the manufacturing operation. The reason some companies have not gotten the expected benefits from MRP is that they have not considered this logical sequence of events.

DRP was designed to help make the following decisions:

- When and how should stock be brought into the distribution system — via purchasing or manufacturing?
- When should stock be moved within the distribution system? How much stock should be moved?

In making these decisions, DRP always considers the current and projected status of the entire distribution structure. Unlike the order-point systems traditionally used to run the distribution function, DRP evaluates stocking requirements as a function of time.

DRP allows forward visibility by expressing future stocking and transportation requirements as a function of projected demands and projected conditions (time-phased projections) rather than by statistical evaluation of historical trends (order points, order quantities and safety stocks).

Two key DRP concepts are the distribution structure and the differences between dependent and independent demand.

(Continued on SR/8)

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Assess Cost, Benefits Before Implementing MRP

By Thomas L. Glaza
Special to CW‡

The bottom-line impact of computer-based manufacturing control systems is perceived to be difficult to estimate. In fact, the areas in which benefits and costs will accrue are well known. What is difficult to estimate is exactly where in the range of possible benefits and costs a specific company will fall. Estimating is fairly easy, achieving confidence in the estimate is difficult.

For this reason, almost all companies initiating manufacturing systems do not try to put together a business case. However, the failure to develop an adequate business case is one of the major reasons many implementation efforts are not successful.

The assessment of potential savings and costs represented in the business case should not be considered just an exercise to help make the decision to implement. More importantly, the assessment is required to help assure that top management will continue to allocate resources to the project despite the inevitable setbacks that usually occur with such complex systems. In other words, a project with the potential impact of $500,000 per year on the bottom line gets a lot more management attention and resources than one that is perceived to replace three clerks.

Unlike applications such as payroll and accounts payable, manufacturing control systems do not simply "automate" the old way; they introduce a new approach to managing the enterprise. If utilized correctly, this new approach can have a tremendous impact on most manufacturing companies. However, this "newness" also requires a considerable investment of resources. Both benefits and costs must be estimated.

A business case normally consists of four elements:

1. A statement of the scope of the project, such as what systems are going to be implemented and in what sequence.

2. An estimate of the range of the probable impact on profitability as each system is implemented.

3. An estimate of the costs and resources needed to implement each

(Continued on SR/10)

Software Lowers Cost of Systems

(Continued from SR/3)

only must the product be sound, but the vendor should be adequately capitalized and have an effective marketing staff.

Even while you are evaluating the various MRP packages, you can take steps to hasten the day the chosen package actually begins effectively performing its functions. This preparation involves two areas — data input and employee education.

If the MRP system you purchase is a full-function package, you will need to enter data on the following aspects of your operation:

- Parts Identification. Each part used in your end product must have a number or other identifier, a description and order information.
- Bill of Materials. By defining relationships of parts to one another, the bill of materials details how the product is constructed.
- Scheduling Methods. If you have a satisfactory method of scheduling production, the MRP package should conform to it. If you do not, you will want to develop one since an MRP system is of limited value without it.
- Vendor Information. This list must provide one or more vendors for each part and the price each vendor charges.
- Shop Floor Procedures. This document describes the procedures required to create the finished product. If your shop floor routing is complex — involving 30 or 40 operations — look for a flexible system that can allow for changes.

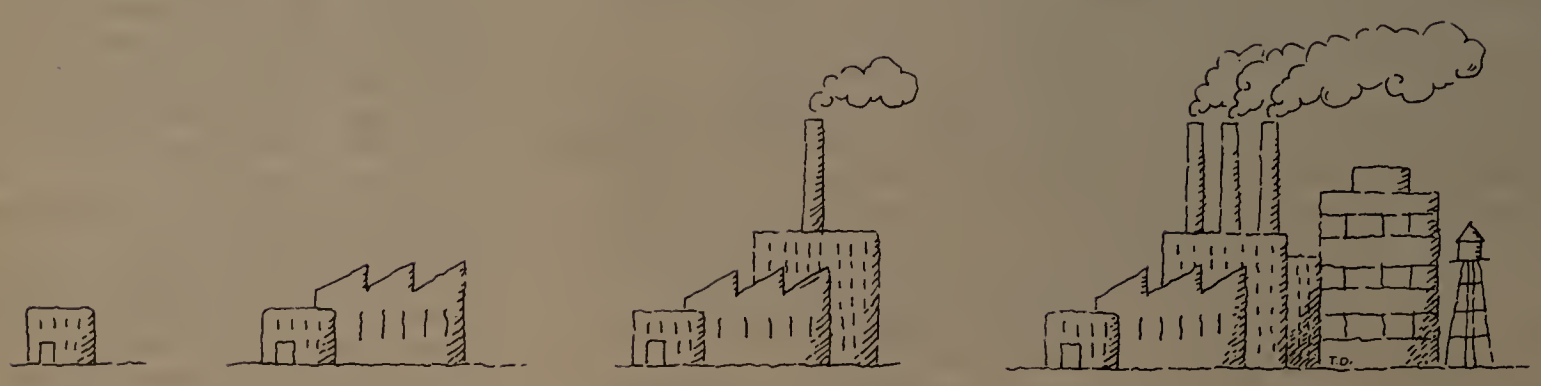
The second area in which you can prepare for MRP system implementation is employee education. Although training itself can start only after you have decided on a particular system, you can begin to educate your employees in a general sense about MRP and micros at any time.

There are numerous courses and seminars now offered in MRP through professional organizations such as the American Production and Inventory Control Society and the American Management Association.

By organizing your MRP data base and fielding a team of employees educated in MRP, you will create an optimal environment for rapidly implementing a microcomputer-based MRP package that provides sophisticated inventory control and purchasing and manufacturing capabilities previously available only to large manufacturing companies.

Meyer is vice-president of marketing at Micro MRP, Inc.

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Integration Seen Key To 'Factory of Future'

(Continued from SR/2)

models help make automation decisions (see Figure 2). In SMU 1, for example, the product is highly focused and mature so that there is a limited need for computer-aided design or engineering since the product is not likely to be modified.

SMU 3, on the other hand, represents highly specialized products made in batches that can effectively benefit from virtually all types of computer automation.

There is a twofold challenge here: choosing the proper use of automation to reduce the labor content and improve the productivity of a specific function and ensuring integration by linking functions together with information flow to improve factorywide productivity.

While automation decisions are ultimately the responsibility of the manufacturing executive, the DP executive needs to understand the trade-offs involved in their selection in order to make factory integration work.

A detailed understanding of these automation choices and integration requirements will be vital to developing the information and communications links among functions that will drive the factory of the future. Thus, the role of the DP executive will be complex and demanding. While systems are becoming more functionally specialized and simpler for the user, their integration is becoming more difficult.

Diverse Data Forms

With computer-aided design (CAD) systems, robotics, computer-aided process planning and financial systems all generating information there will be an exponential increase in the amount of data generated throughout the factory, and it will be diverse, usually incompatible, forms.

This presents unique opportunities for the DP executive who has the skills and expertise to manage the massive flow of information and serve as the integrator in the factory. Traditional DP skills will need to be coupled with familiarity with manufacturing systems and operations and detailed understanding of graphics, engineering design, robotics and shop floor control systems.

The integrator will be responsible for developing, maintaining and upgrading the shared manufacturing data base — the hub of the factory of the future.

There are other issues related to computers in manufacturing that the DP executive can influence. One of these is software standardization. Robots, CAD systems, production planning systems and the like are currently controlled by different software and specialized languages.

It will take a highly skilled specialist to work out these incompatibilities. This task is all the more difficult because higher level computer languages for manufacturing are less developed than languages such as Fortran and Cobol, which serve engineering and business. The factory is extremely complex and requires software capable of producing graphics and performing physical movement in addition to data manipulation, file maintenance and presentation.

Communication links as well, including modems, I/O devices and the like, are generally lacking in the factory. The DP executive with communications expertise can play a key role in developing and adapting these to the manufacturing environment.

Experience in a number of factory-of-the-future types of assignments has clearly shown that the benefit of integrating manufacturing systems is greater than the sum of gains from automating individual functions, in terms of cost, time and labor savings, as well as flexibility.

The integrated factory, so vitally dependent on information links, will provide enormous challenges and opportunities for DP execs

Skinner is a vice-president of Booz-Allen & Hamilton, Inc. and leader of the firm's manufacturing technology practice. Burrows is a principal and Dratch is a senior associate with the firm.

Computer Applications in Factory of the Future	SMU1 (hard automation, high volume, flow production)	SMU2 (flexible manufacturing systems, cyclical production)	SMU3 (batch production, flexible manufacturing systems/ conventional/NC)	SMU4 (specialty manufacturing NC and conventional)
Computer-Aided Engineering (engineering, analysis, simulation)			X	X
Computer-Aided Design (design, drafting)		X	X	X
Computer-Aided Manufacturing (robotics, materials handling, NC lathes)	X	X	X	X
Computer-Aided Testing	X	X	X	X
Computer-Aided Logistics (order entry, inventory)	X	X	X	
Computer-Aided Process Planning		X	X	
Computer-Aided Financial Planning			X	
Level of Integration Required:	Lower	High	Highest	Moderate

Source: Booz-Allen & Hamilton

Figure 2. Automation Requirements

Distribution Resource Planning Emerging As Essential DSS Tool

(Continued from SR/5)

A good DSS has the ability to simulate varied situations. DRP can simulate the results of changes in the distribution structure. It can also simulate the results of moving from one form of transportation to another. And it can determine the potential profitability of building a manufacturing plant or distribution center or of negotiating a new contract with the vendor.

Companies using DRP can expect significant results including reduced inventory investments and distribution and manufacturing costs, improved control over purchasing costs and increased customer service levels and market response time.

But perhaps most important, companies using DRP can expect to improve their ability to make decisions that directly affect the productivity and profitability of their operations. This is the true impact that should be expected from DSS in the future.

Moldauer is a cofounder of Distribution Research Associates, Inc. of Oakbrook, Ill., a firm offering DRP software, consulting and education to manufacturing, distribution and retail companies.

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Merging Design Systems With Robotics

Researchers Working Toward Integrated Factory

By Tom Henkel
CW Staff

While many manufacturing firms have successfully automated their corporate, design and manufacturing operations, few have been able to integrate them effectively into a single, smooth-running system.

They have yet to pull together such highly individualized systems such as computer-aided design and manufacturing (CAD/CAM) and robotics into a truly integrated factory.

Researchers working toward such a goal contend that products currently on the market, except for a few specialized systems, were not designed to be easily integrated. And achieving such an integration often requires a lot of customization, such as special interfaces, expensive software and hardware.

Even then, some researchers believe that with current technology, the result is most often an awkward, rather slow-moving system.

The integrated factory promises many benefits. For example, it will be easier to design, test and produce new products. And top company officials could use computer-generated forecasting and analysis techniques, coupled with computerized sales reports, to evaluate production and distribution schedules on a daily or perhaps hourly basis.

Glaring Missing Link

But despite what many believe to be phenomenal potential, automated factories still appear to be a few years away. Perhaps the most glaring missing link is an effective way of merging design systems with robotic manufacturing systems.

Steve Miller, a robotics researcher at Carnegie-Mellon University, noted, "You just can't buy pieces off the shelf and integrate them into a nonspecific application." Miller said many robot manufacturers have failed to develop robots capable of being used with other vendors' control units.

Yehonathan Hazony, director of the Interactive Computer Graphics Laboratory (ICGL) at Princeton University, noted that while many programmable robots can perform rather impressive tasks, most are designed to operate in a stand-alone mode.

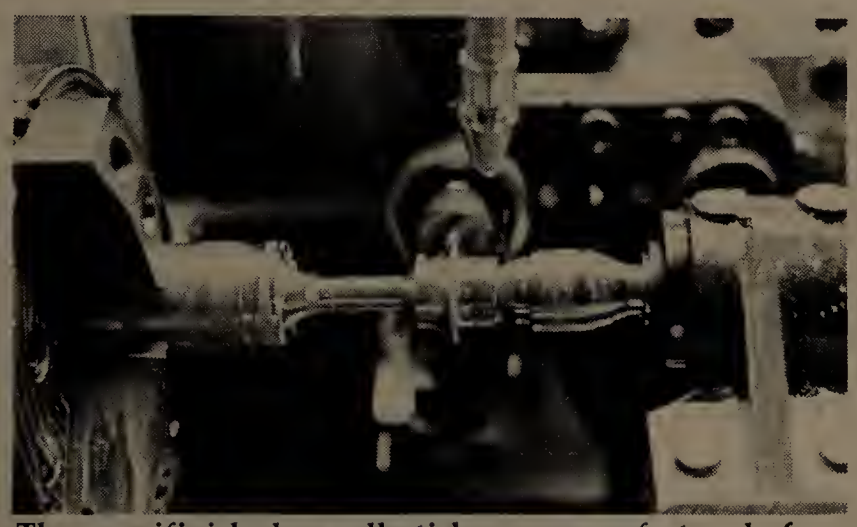
This means that in order to link robots with a CAD system, the user is faced with developing the appropriate interfaces and software.

Princeton's ICGL was confronted with such a problem in its project to teach a milling robot to accept commands and design information directly from an IBM 3081 mainframe.



Dr. Yehonathan Hazony (left), Willet E. Carver view the making of a candlestick.

Operating under a $1 million joint research agreement with IBM, the milling robot can make a variety of metal designs produced on the IBM system using a specialized language developed at Princeton.



The semifinished candlestick — manufactured from Princeton University's robot milling machine.

The system can evaluate a design, tell the user whether the cutting devices installed on the robot are adequate for the job, calculate the number of passes the milling machine will have to make to cut a specific metal and give the user an estimate of how long it will take to make the designed part.

The biggest problem in integrating the milling machine robot into the IBM system was developing a variety of interfaces to allow the robot to communicate in IBM's VM/CMS operating environment, Hazony said.

Many programmable robots accept instructions on paper tape that have to be manually loaded onto the system, the Princeton researcher noted. Consequently, with tape-driven machines, when the user wants to alter the robot's duties, it has to be done manually.

The Princeton robot was designed to accept directly milling programs generated on the IBM 3081. The drawback, however, is that the entire program has to be downloaded to the programmable robot.

For example, a 3,000-line program to cut a fairly intricate 3-in.-long candlestick from a 1½-in. brass rod took roughly one-fourth the time to download as it did to manufacture. It took about five minutes to download the program and about 20 minutes to cut the candlestick.

Most Are Adaptable

Howard K. Dicken, president of DM Data, Inc., a technology research firm, noted that most robotics systems can be adapted to operate in conjunction with a CAD/CAM system, but many firms lack the technical expertise or are unwilling to spend the money to achieve that result.

According to Dicken, however, firms that do spend the money to develop integrated CAD/CAM-robotics systems may be better off in the end. Many firms make the mistake of installing robots to perform today's work load. When the company makes even minor changes in its product, a major retooling effort is required, he maintained.

Firms with integrated robotics systems will have the advantage of flexibility. If such a firm makes a design change, the robot can be retooled fairly easily, according to Dicken.

"Robots are still being applied like Band-Aids," Dicken said, noting that many robot users lack the technical skills necessary to develop a system that incorporates a master control for a variety of technical functions.

While current robots may be difficult to integrate into CAD/CAM systems, some firms offer products that appear to lean in that direction. Unimation, Inc., the top robotics manufacturer according to technology analysts at DM Data, for example, claims its Puma line of robots was designed to interface with an RS-232C protocol to make it easier to connect the unit to a host.

Unimation's product manager, Tim Retko, said the Puma's VAL 2 control software can be integrated into a variety of processors and intelligent devices.

Likewise, Cincinnati Milicron, Inc. (which DM Data lists as the No. 2 robotics firm) said its line of robots was designed with commu-

(Continued on SR/11)

Help Wanted: Robot Technicians

By Katherine Hafner
CW Staff

The newest kind of factory worker may not need vacations, incentive plans, unions or even sleep. But one thing industrial robots do need is people who are trained to repair and maintain them.

With the estimated 25% to 30% increase in the use of robots in the next decade, concern has been expressed over whether there will be more robots than people who can fix them.

Many robot manufacturers and veteran soothsayers are not only quick to dispel such a notion, they caution against a possible overabundance of robot technicians in years to come.

"If we're not careful, we're going to find ourselves in the same situation we did with teachers and engineers," warned Pat Rosato, director of training and publications at Unimation, Inc. in Danbury, Conn.

"Students in their third semester of a two-year robotics program who are anticipating no trouble finding a job may be right," noted William Tanner, president of Productivity Systems, Inc. in Farmington, Mich.

"But high school seniors planning to enroll in two-year courses may find in 1985 that there's a glut on the market," he added.

Tanner said robotics has become a "buzzword" for many universities that are hastily revamping their curricula to accommodate the needs of robot technology.

Alter Existing Courses

Rather than introduce a dramatic change in their course offerings, Tanner suggested, schools can alter existing courses slightly to make them applicable to skills that would be required for robot maintenance.

The large robot manufacturers, such as Unimation, Asea, Inc. and Cincinnati Milicron, Inc., provide in-house training programs for their users' maintenance staff or for workers whose jobs have been displaced by a robot.

"Not everyone who is displaced by a robot is capable of being trained to maintain it," Tanner commented. "A lot of people lack the necessary grounding.

"On the other hand, I know some people with computers in their basements, and while they're putting cars together, they're writing programs in their heads," he said.

Estimate Cost, Benefits Before Installing MRP

(Continued from SR/6)
subsystem.

4. An assessment of the risks of both obtaining the benefits and staying within budget.

There is an element of "time phasing" in the first three portions of the business case. Since the various subsystems will be installed over a period of time, benefits and costs should also be distributed to acknowledge this time phasing.

Assessing Cost, Benefits

The following is an assessment of the major benefits and costs by subapplication. Each subsystem is analyzed in a sequence that approximates that taken by most manufacturing companies.

Product data management concerns the creation and maintenance of item data, bills of material and routings. Almost all companies will be faced with restructuring (rewriting) the bills and cleaning up the routings. This is usually a major effort, but most companies dramatically underestimate this effort.

Although some significant benefits accrue from product data management, the impact on the bottom line is usually not considered significant.

Inventory accounting concerns the establishment and maintenance of the inventory accuracy required by the material planning systems. To accomplish this, stockroom disciplines must be established, including stockroom consolidation, construction of a fence to limit access and manning of the stockroom with personnel who pick items and manage available space and batches of material.

Many companies consider the cost of consolidating and manning the stockrooms so onerous they often try to avoid it. In doing so, they often kill the project right at this point. Experience has shown, however, that considerable benefits do result from the implementation of inventory accounting, such as better utilization of storage space, more efficient picking of parts and better control. This results in a reduction of assembly scrap.

Such savings usually more than offset the costs; however, they are often not measured and therefore the costs are often considered additional expense.

Shop floor control concerns the tracking of manufacturing orders through each work center and the accumulation of actual material and labor costs. Shop activity reporting systems must usually be altered, and training costs are significant. Data collection equipment is often acquired to assist transaction reporting efforts.

These costs are offset by some rather dramatic savings:

- A 20% to 40% reduction in work-in-process inventory.
- A 3% to 10% improvement in direct worker productivity.
- The virtual elimination of such jobs as expeditors and stock chasers.

Materials planning comprises three subsystems: forecasting, master production schedule planning and material requirements planning (MRP). Other than training, there are no significant implementation costs. The benefits, however, are dramatic: 15% to 40% reductions in the level of component parts and raw material, 10% to 20% reductions in finished goods inventory, 70% to 95% improvement in on-time delivery and 3% to 15% improvement in shop floor productivity.

Because of the dependency of MRP systems on the

(Continued on SR/12)

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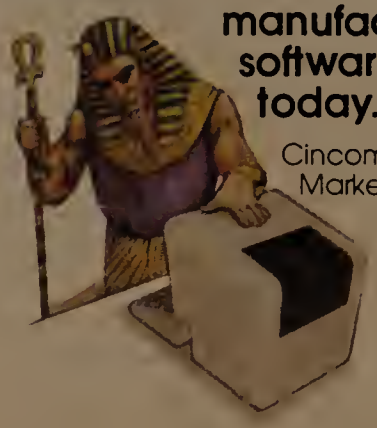
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Designing Space for Robots a Complex Problem

By Tom Henkel
CW Staff

The problems involved in integrating robots with complex computerized design and manufacturing systems is only one stumbling block in the path of the automated factory.

Designing the manufacturing floor so that robots can work effectively is another, possibly more complex problem, according to Steve Miller, a researcher on the applications and implications of robotics at Carnegie-Mellon University in Pittsburgh, Pa.

Miller explained that getting raw materials to the robot, placing them in such a way that the robot has access to the parts and tools necessary to complete a job and moving completed items from the robot's area are very complex problems, especially for the factory retrofitting robots into its operation.

In many cases, Miller said, it becomes necessary to have a computer system to design factory floors to accommodate robots.

Design Problems

The design problem is made more complex when a factory makes even a slight change in the way a robot functions because the firm must also change the position of the units supplying parts or services for the robot.

"You can over-control and over-automate something that will become obsolete," according to Howard Dicken, president of DM Data, Inc., a technology consulting firm. Dicken said that companies thinking of installing robotics systems should try to avoid situations in which their robots lock them into a particular manufacturing format.

Carole Cunningham, engineering manager for Cincinnati Milicron, Inc., said that one of the problems with linking robots directly to a design system is that subtle differences in the robot's position can cause problems. In many cases, Cunningham noted, those problems have to be resolved by manual intervention.

Integration Of Robotics Still a Goal

(Continued from SR/9)

nications capabilities to help them interface with some intelligent devices, but the firm has yet to announce a product designed specifically to link robots directly to mainframe-driven CAD/CAM systems.

According to Cincinnati Milicron's manager of engineering, Carole Cunningham, that does not mean the firm's robots cannot be used with CAD/CAM systems. In fact, Cunningham said, a recent McDonnell Douglas Automation Co. defense contract used Cincinnati Milicron robots in a mainframe-driven system.

Nevertheless, researchers like Hazony and James P. Poage, Princeton's director of university computing, accuse robotics firms of generally looking at the factory automation issue through myopic eyes.

Poage contends that robotics vendors, as well as many companies using robots, view robots as machines that simply replace a human in performing a given level of work.

DM Data's Dicken noted that the idea of integrating robots with other corporate computer systems is still a relatively new concept that will take several years to become popular.



Applying MRP II Principles to the Selection,

By Bob Ahern
Special to CW‡

MRP II is manufacturing resource planning made possible through the use of the computer.

The goal for a company implementing MRP II is to progress out of the reactionary mode of expediting, hot lists, red tags and excessive overtime and into the proactive mode of effective planning and control of the manufacturing process.

Yet for many companies the attempt to implement MRP II has been an exercise in pre-MRP II management. The process has included missed schedules, rush orders, overtime and the unavailability of needed "parts" or "subassemblies," such as software modules, educational materials and people.

Perhaps this situation can be improved by applying the principles of MRP II to the selection and implementation of manufacturing control software.

This article will attempt to bridge the communications gap that often exists between systems people and manufacturing people by illustrating ideas for applying MRP II principles to the selection and implementation project.

This bridge will be built using examples that highlight certain components each group should *already* understand and components each group *must* understand. Selecting and implementing an MRP II system is not that different from manufacturing any other product.

(Continued on SR/13)

Assess Costs Of MRP First

(Continued from SR/10)

previously mentioned subsystems, these benefits usually do not start to occur until nine months to two years after implementation begins. The upper limit of the benefit ranges will not be reached until the entire system is installed.

Other systems such as capacity planning, order entry and invoicing and purchasing enhance the overall effectiveness of the total manufacturing control system, each driving the percentage impact toward the higher end of the ranges mentioned.

Despite the difficulty of estimating with confidence, management should make an effort to develop a business case. Even if the lower points on the ranges of possible benefits are selected, their sum will usually far exceed estimated costs. As long as these estimates are time phased fairly well, management's expectations should be reasonable and the proper amount of resources made available.

The major elements of the cost of systems implementation occur early: restructuring and cleaning up bills of material and routings; consolidating stockrooms and establishing the disciplines necessary to achieve inventory accuracy; and training personnel to perform implementation tasks in the new way of doing things.

The major bottom-line impacts occur later in the implementation process, such as the shop floor and material planning application areas. These impacts are lower inventories, higher productivity and high sales due to better customer service.

The business case must realistically assess the probable later profits in order to sustain the front-end investment. Management must be aware of the synergism of each subsystem upon the total system. It is only then that management will ultimately achieve all possible benefits.

Glaza is president of GMD Systems International, Inc., Atlanta, Ga.

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Implementation of Manufacturing Software

(Continued from SR/12)

Consider the following common traits:

- All operations to be performed must be identified.
- The required resources must be available when and where they are needed.
- The completion of the various subassemblies must be synchronized through careful scheduling.
- The process must be completed on schedule, while giving full consideration to the capacity constraints of the organization.
- Production activity must be reported and measured to ensure effective control and adjustment of schedules, priorities or capacity as required.

A prerequisite to utilizing MRP II to plan and control a manufacturing process is the establishment of valid and accurate records in the computer files. Accuracy must be established in inventory, bills of materials, routings, work centers and costs.

One of the most important tasks in this process is establishing accurate bills of materials for all products. The bills must reflect the way the product is actually manufactured. In short, they must be a reflection of reality, and reality is the shop floor.

Having established the need for accurate bills of materials in an MRP II system, the logical first step is to structure the MRP II bill of materials.

In studying this bill of materials, the systems analyst should recognize that a more structured approach to planning and controlling an MRP II project may be apparent in the system itself.

'The benefits to be realized from MRP II are not achieved by simply having the hardware and software systems installed, but result from effectively using these tools in the management of the business.'

The first level of the multilevel bill breaks out the four major subassemblies involved in an MRP II project: justification, system selection, implementation and ongoing review of the operation of the system. The lower levels of the bill are used to detail the components that make up each subassembly. For illustration purposes, only the system selection subassembly has been detailed.

It should be noted that while only one subassembly has been detailed — system selection — and only one major component of that subassembly — system evaluation and selection — each of the other major subassemblies would be detailed in the same manner in the completed bill. System selection has been detailed only for the sake of example and not because of its relative importance in the overall implementation of MRP II.

In fact, hardware and software are only a small part of the total system project, commonly representing 20% to 25% of the effort involved. MRP II is a people system, and the balance of the efforts are the people tasks of training, determining requirements and specifications, implementing and using the system to plan and control daily operations.

The benefits to be realized from MRP II are not achieved by simply having the hardware and software systems installed, but result from effectively using these tools in the management of the business.

'The improvements in productivity made possible by MRP II have provided many manufacturers with the competitive edge necessary to survive in an era of increasing competition and international markets.'

The completed bill of materials would, of course, detail all the components of the MRP II project. Parts and resources, such as hardware, software, educational materials and people, would be defined as needed in each subassembly.

The process of applying MRP II principles to the management of an MRP II project could be carried much further to include available resources, schedules, costs, lead times and so on. Additionally, MRP II can serve as an excellent communications and educational tool.

This exercise of developing a bill of materials can also serve to support the use of outside consultants with experience in selecting and implementing MRP II systems. To complete the bill at the level of detail required to utilize it in actually planning and controlling the project is no simple task.

For a company that is considering implementing MRP II for the first time, the process of developing the MRP II bill of materials is similar to developing the bill for a complex, custom-built product with which the company has limited experience. But for the experienced consultant, the product has been built before.

Although the basic bill of materials will require engineering changes that reflect a particular manufacturer's requirements, that basic bill has been structured by past experience and already exists in the mind of the consultant. That experience will prove invaluable to a company that is just embarking on the MRP II journey.

The improvements in productivity made possible by MRP II have provided many manufacturers with the competitive edge necessary to survive in an era of increasing competition and international markets. Some manufacturing executives may view MRP II as a problem, having been forced to improve productivity and reduce costs by competitors who have already implemented improved systems. But like most complex business problems, this one represents a definite opportunity.

Ahern is a data systems consultant specializing in the manufacturing and distribution industries with Ernst & Whinney in Nashville, Tenn.

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Manufacturer Boosts Efficiency With MRP II

PORTLAND, Ore. — Nearly 1,000 production employees at the Bingham-Willamette Co. in Portland and Shreveport, La., have entered the computer age.

To help the company manage its payroll and production operations more efficiently, workers are using computer terminals located on the shop floor to enter daily time and attendance data as well as details about jobs performed and equipment used.

Based in Portland, Bingham-Willamette has been a manufacturer of custom pumps for more than 50 years. The company has additional locations in Canada for a total of nearly a half-million square feet of manufacturing space.

"As our business continued to grow in volume and complexity, we realized the benefits inherent in broad-scale computerization," Mike Ala, the firm's director of information systems, observed.

"We severed our service bureau relationship in 1980 to establish an in-house data processing department, with the eventual goal of adding a computer-based manufacturing resource planning (MRP-II) capability," Ala said.

"When fully implemented, this system will allow us to schedule and plan the use of materials, plant facilities and labor, thereby achieving higher levels of efficiency and production, while keeping direct costs as low as possible," he concluded.

Bingham-Willamette took the first step toward its goal in 1981 with the installation of a sophisticated shop floor data collection system. It was built around a Honeywell, Inc. Factory Management System (FMS) and used custom software designed in-house.

"We have as many as 4,500 work orders in progress daily at our Portland facility alone, so an on-line system like FMS is a necessity," according to Lee Campbell, a project development director.

"A labor reporting system is one of the first ingredients in an MRP-II system, along with the actual shop floor data collection — that is, labor and work order tracking," Campbell said.

"Honeywell's FMS handles the routine time and attendance recording, but also performs on-line validation of information plus error reporting — capabilities that none of the other six products we evaluated had," he said.

Hardware associated with the FMS includes a Honeywell DPS 6 or Level 6 minicomputer, which drives the system and controls CRT terminals and special-use time and attendance and labor-reporting terminals. A given FMS installation can operate as a stand-alone system or as part of a distributed network, sharing information with a Honeywell or IBM host computer.

Software includes the Gcos 6 operating system, common to all Honeywell minicomputers, plus Factory Terminal Facility and Factory Application Facility packages.

Ala and Campbell started with the basic FMS system software to help collect, validate, report and control interactively shop floor labor data. They added custom software to specialize labor reporting and to implement work-in-process tracking and exception reporting.

The system is written in Cobol and Transaction Control Language. Hardware includes Honeywell Level 6 minicomputers, VIP7200 CRT terminals, Honeywell FDC3305 labor reporting terminals, line printers and serial matrix printers.

Management must have access to data collected on the shop floor in order to analyze that information and then act accordingly to achieve maximum production with minimum costs. This integration is achieved on the Bingham-Willamette system via a combination of on-line display and hard-copy output of collected data.

"Basically, a production employee uses the system by inserting a blue ID badge, a white job badge and a red machine badge into the 'magnetic-striped' reader on the Honeywell 3305 terminal," Campbell said.

"The badges are encoded magnetically, may be viewed on the 3305's display screen if necessary and, since the badges are created using the computer, the information on them is validated on-line when read. If any of the information is incorrect or the badge insertion sequence is incorrect, an error message is displayed on the terminal," he explained.

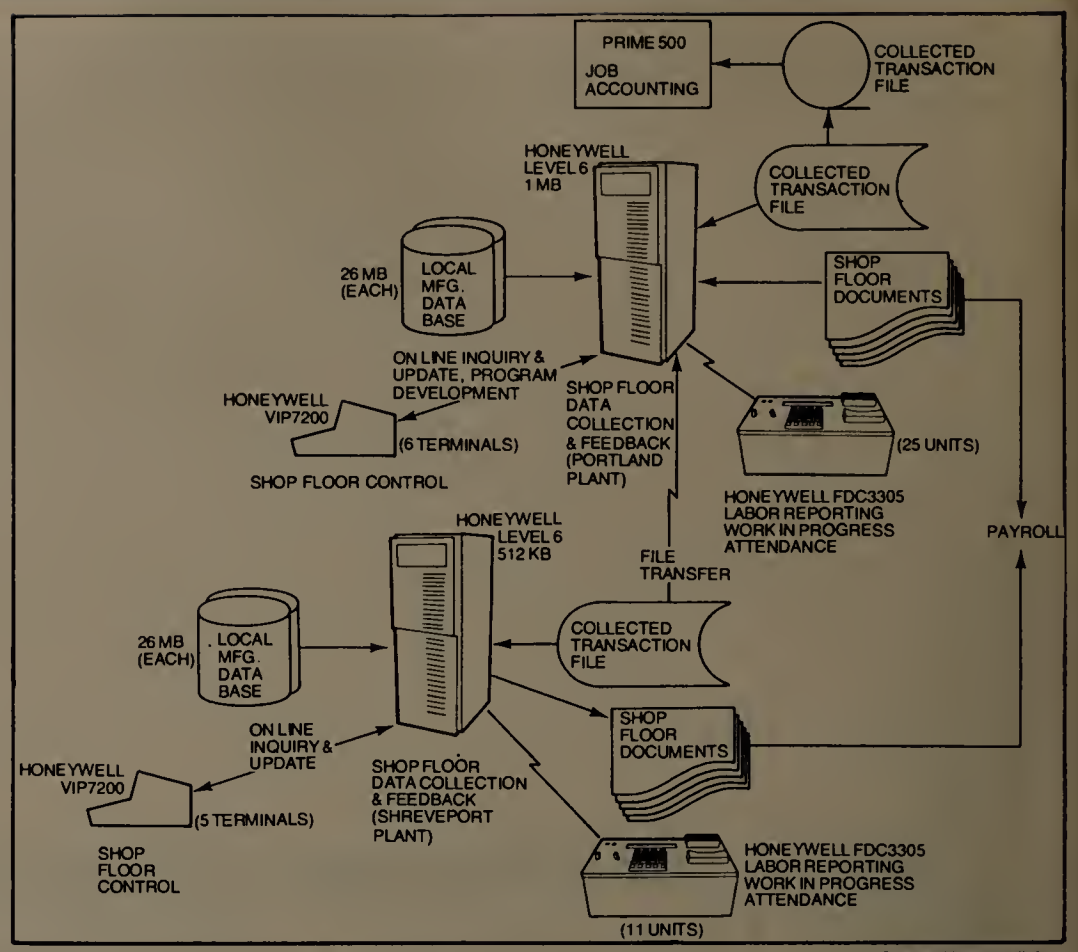
Management Functions Twofold

The management or "back room" functions of the system essentially are twofold. One generates work orders (shop orders), including the badges, and the other reviews and validates attendance and related reports. Work orders are generated by manufacturing planning department personnel, using a Honeywell VIP7200 CRT terminal.

This function, plus printing the work order and encoding the magnetic-striped job badge, is accomplished at a work center cluster that consists of a VIP7200 terminal, a Honeywell matrix printer and a magnetic encoder.

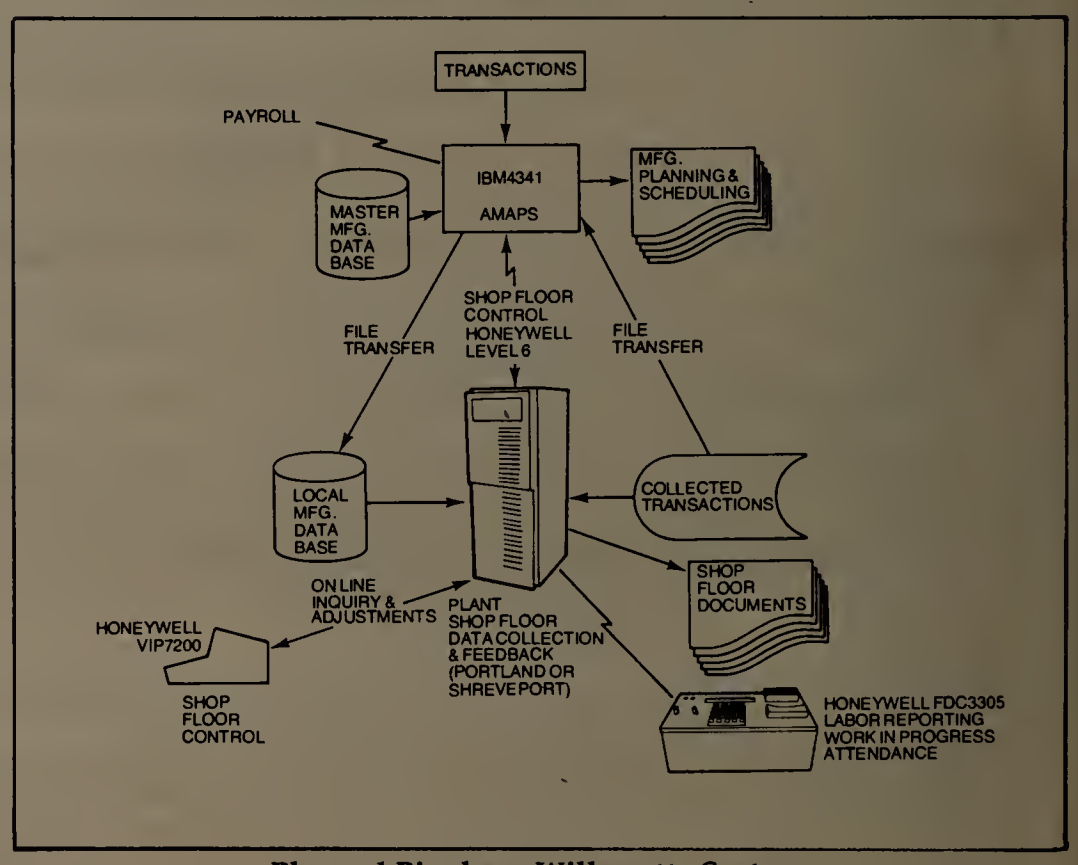
"The system is particularly useful because it helps avoid conflicting labor and job reports and it tracks job progress according to preset standards," Campbell said. "For example, an employee does not complete a job at the end of the day's shift. When he comes to work the next day, the system will not accept him on any other job until he finishes the one from yesterday.

"When that job is finally done, he enters the time spent on each machine plus units produced or operations performed. For statistical purposes, this information is later compared to our standards for that particular operation. In this way, the system helps assure that we have the right people doing the right jobs in the right order."



Charts: Honeywell, Inc.

Current Bingham-Willamette System



Planned Bingham-Willamette System

Reports are produced on-line when required, using Honeywell's Info 6 query utility. The master report lists each employee's time in and out on each job worked, quantity completed and the elapsed regular, shift differential and overtime hours. Total hours of each employee are generated at the end of his entries on the Honeywell 3305 terminal.

Totals are broken down by direct and indirect (lull time) and also are generated for the entire shift. "This report is reviewed by the supervisor for accuracy," Campbell said, "with corrections being made on the report and data entered interactively via a VIP7200 terminal."

Supervisors' ID badges contain special codes that enable them to override the system manually to authorize an employee's reopening a completed job or working two jobs simultaneously, to authorize overtime or to make other nonstandard transactions.

A fourth color-coded badge, yellow, is used when an employee is on indirect time. This may be due to a training session, work not ready, machine failure, lull time or any other activity not directly related to production.

"The top priority in a factory data collection system is response time," Ala said. "On average, each production employee makes five transactions per day, spending no more than 10 seconds with a 3305 terminal for any one of them. That's quite fast considering the extent of our customized validation procedures."

The second phase of Bingham-Willamette's MRP-II implementation involves tying the FMS Level 6 controller directly into its IBM 4341 host system, which runs a third-party manufacturing data base system known as the Automated Manufacturing, Accounting and Production System (Amaps).

Once this is accomplished, the Amaps shop floor module will communicate work orders and other data directly to the Level 6 and onto the shop floor terminals. Stored data will also be sent to the host system following processing on the Level 6, which will remain dedicated to the shop floor.

Firm Goes Outside for Manufacturing System

NEWARK, N.J. — A computer services company has helped a local manufacturer of lighting equipment gain control over its inventory and manufacturing systems.

Canrad-Hanovia, Inc. is a Newark, N.J.-based manufacturer of high-intensity lighting equipment used in commercial and industrial products like motion picture projectors and scientific instruments.

The company has grown since 1970 from a $3 million research-and-development-oriented firm to one having an annual sales volume of more than $20 million.

But as Canrad-Hanovia grew, it increasingly felt a need to computerize both the manufacturing system and the business and accounting functions. The company was concerned primarily with getting better control over its manufacturing and inventory systems, according to Harry J. Shutt, senior vice-president.

"In the manufacturing area, we must have good, clean bills of materials," Shutt said. "We must have paperwork in place that will take care of withdrawals from the stockroom to the shop floor in the manufacturing plant and take care of documenting the movement of finished goods.

"Although we have been creating this kind of paperwork for years, what we needed from a computer system was to enforce a keener level of discipline over that paperwork." In 1976 Canrad-Hanovia went to Automatic Data Processing, Inc. (ADP), a computing services company, to provide a manufacturing system suited to its needs. The manufacturer had been using ADP for batch processing of its payroll, accounts receivable and sales analysis since the early '70s.

Needed On-Site Computing

Although batch service — in which data was picked up at Canrad-Hanovia's offices, processed at an ADP regional computing center and returned in the desired formats — proved satisfactory for several years, the company's growth forced it to consider on-site computing.

"Initially, we went from batch to on-line for invoicing, accounts receivable and sales analysis," Shutt recalled. "But due to the rapidly increasing volume of our transactions, it became very obvious that we had to have a computer on-site. So we evaluated having ADP give us a manufacturing system or do it ourselves. We opted for ADP because we didn't want to be concerned with hiring and retaining data processing professionals."

Canrad-Hanovia's system, which was created for the company as ADP's first manufacturing system customer, has served the company since 1977. The stand-alone system, consisting of a minicomputer, six CRT terminals and two high-speed printers, handles order entry, invoicing, accounts receivable and sales analysis for the firm's 2,000 customers, of whom 500 to 600 are active in any given month.

The system also handles purchasing and accounts payable, including cash disbursements, as well as inventory control, including job cost accumulation and bills of materials requirements planning. The ADP system has even helped reduce Canrad-Hanovia's inventory of 2,000 finished products and nearly 10,000 separate inventory components by about 20%, Shutt said.

"We installed the system not with the idea of eliminating people, but with gaining control over our operations and being able to have timely information with which we could react properly," he explained. "We sought to reduce our inventory — which we have — by approximately 20% over a five-year period. We've also reduced the number of stockroom people by 30%. We are using the system to control our inventory, both in terms of the way we plan our manufacturing requirements and the actual purchasing and expediting of material."

Canrad-Hanovia was able to get virtually all the features from a computing system that it required through ADP's program packages. Since the company was ADP's first manufacturing system user, new features were written into the programs. Those features are now standard parts of the ADP system.

On a monthly basis, the system produces a variety of management reports and summaries that make it easier to manage the business, Shutt noted. These include an accounts receivable aging schedule, sales analysis report by customer, by prior year-to-date and by customer for each sales representative, plus inventory reports that have become indispensable business tools.

"We run an extended inventory report in descending dollar value, and we use that as a basis to select items for test counters," Shutt explained. "We have those items count-

(Continued on SR/18)

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Planning Critical to Small Firms' MRP Success

By Geoffrey Sarkissian
Special to CW‡

The giant corporation's success with manufacturing resource planning (MRP) has led many small manufacturers to believe that they, too, can benefit by installing an automated MRP system.

All too often, however, the small company's MRP system fails to produce the desired results — decreased inventory carrying costs and increased productivity. To reap the benefits of MRP, the small manufacturer must know how to choose and implement an appropriate MRP system scaled to his size of operation.

A large corporation devotes considerable resources to production planning and scheduling with the goal of minimizing inventory and preventing assembly line slowdowns. Long and predictable lead times develop in these companies to smooth out variations in work orders and to keep machines and workers operating at maximum efficiency.

In contrast, a small corporation is more directly driven by customer demands, demands that may vary dramatically from week to week. The manufacturer must try to respond to customer requests that an item be shipped before the original due date.

The production manager is frequently forced to abandon a formal production schedule and expedite the shipment. As a result of fluctuating demand and changes in priority, many production managers spend all of their time handling crisis situations and expediting shipments.

Traditional MRP systems are not designed for the customer-driven small manufacturer whose lead times, capacities and required inventories are constantly changing. Materials requirements planning in these systems is predicated on formal master scheduling, priority planning and fixed lead times and does not address the needs of the always harried production manager. When the formal MRP system is imposed on the small manufacturer, it is seldom implemented in its entirety, and it is not always adhered to when it is implemented.

Aiding the Small Manufacturer

What can an MRP system offer the small manufacturer whose operation differs substantially from that of the large corporation? The major tangible benefits come from solving specific manufacturing problems that disrupt production, as the following examples indicate:

Wycoff Corp., with gross revenues of $12 million, has over 50,000 finished-good items of which only a small portion are in production at any one time.

Keeping track of bills of material and engineering revisions, updating costs as raw material costs change and ordering appropriate inventory that used to consume substantial staff time are now handled efficiently by an MRP system.

Chemical Goods Corp., with gross revenues of $6 million, blends about 200 chemicals to produce approximately 100 finished goods. The price of raw goods varied almost daily, and the process of tracking costs, valuing inventory and calculating profits was so difficult it was seldom attempted. An MRP system with lot-controlled inventory allows automatic updating of the cost of finished goods and tracks formula changes as they occur.

General Manufacturing Corp., with gross revenues of $15 million, builds complex capital equipment with lead times of anywhere from six months to 18 months. MRP allows the firm to order inventory so that it arrives just before needed, reducing inventory carrying costs.

Assuming that a specific critical problem has been identified, man-

(Continued on SR/24)

Firm Uses Outside Manufacturing System

(Continued from SR/17)

ed and reconciled to the on-hand quantity. We make adjustments so that we maintain integrity with the on-hand balances shown on the computer.

"We also have what ADP calls 'The Manager.' This system allows us to produce reports keying on data that is in the computer, but it's not called up unless we need it. This way, we can produce extra reports on an as-required basis, and we don't have to depend on a programmer to create it for us."

The volume of transactions on Canrad-Hanovia's system has increased steadily over the past few years — to about 1,200 invoices, 400 to 500 payments and more than 5,000 inventory transactions per month. But whenever greater information storage capacity is needed, ADP simply expands the system, Shutt remarked.

The computing system helped the company make significant improvements in at least two areas — one in manufacturing and one in accounting, Shutt said. "A major effort was made to clean up the bills of materials," he explained.

"Probably in 75% of the cases with a finished product, the bills of materials no longer reflected the way the product was being put together. Changes were made, but corrections in the bills were never made. Now we know in an instant which products use a given part and which parts are on-hand or in short supply. And all parts information is updated continuously and posted on all affected bills of materials."

On the accounting side, Shutt said that cash flow has improved by about 10% over a two-year period with computerized receivables. "Our receivables are aging at an average of 47 days now," Shutt said, "compared to 52 days two years ago. The significant point in this is not that the system has reduced our receivables, but that it has given us timely information with which our people can take action. It has given us the wherewithal to develop more aggressive collection efforts."

Canrad-Hanovia has no intention of purchasing a computer from a hardware vendor, Shutt said. "I would not go away from ADP as long as they maintain our programs.

"I have no desire to make the company responsible for maintaining the hardware, the programs and the operating personnel. We don't want to run a data processing department. We want to run a manufacturing and marketing operation in the lighting industry."

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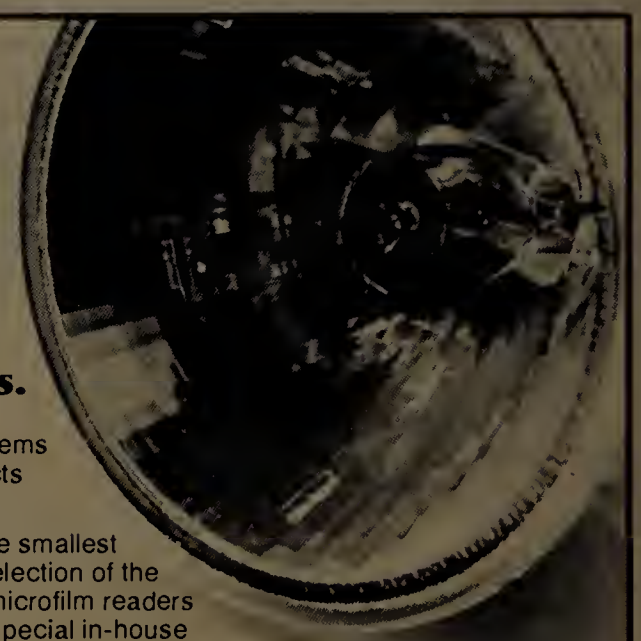
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With Proper Management and Analysis

CAD/CAM Systems Up Productivity, Cut Costs

By Frederick S. Bock
Special to CW‡

Much has been written recently about the need for increases in productivity in manufacturing and engineering firms and the potential to improve productivity and cut costs significantly through the use of computer-aided design and manufacturing (CAD/CAM) systems.

Claims of productivity improvements of fivefold, tenfold and even greater are not uncommon from the vendors of CAD/CAM systems. And in some disciplines, such as electrical or printed-circuit board development, these productivity improvements can and should be attained.

However, you can approach these levels of improved productivity only if the system is managed properly and is used initially for a single-application area. As soon as objectives become oriented toward a multidisciplined applications environment, the overall productivity ratios will drop considerably.

Therefore, be prepared to analyze and report productivity improvement from several perspectives. Utilization of these measurement tools should assist in initial cost justification to management, as well as confirmation of actual attainment of predicted productivity levels when operations commence.

This is not to say the use of CAD/CAM should be discarded because the productivity levels claimed cannot be reached. On the contrary, what is suggested is that it is your responsibility as a potential CAD/CAM system purchaser to research your company's needs and requirements. By doing this, you will be in a position to tell vendors the requirements.

Evaluation Guidelines

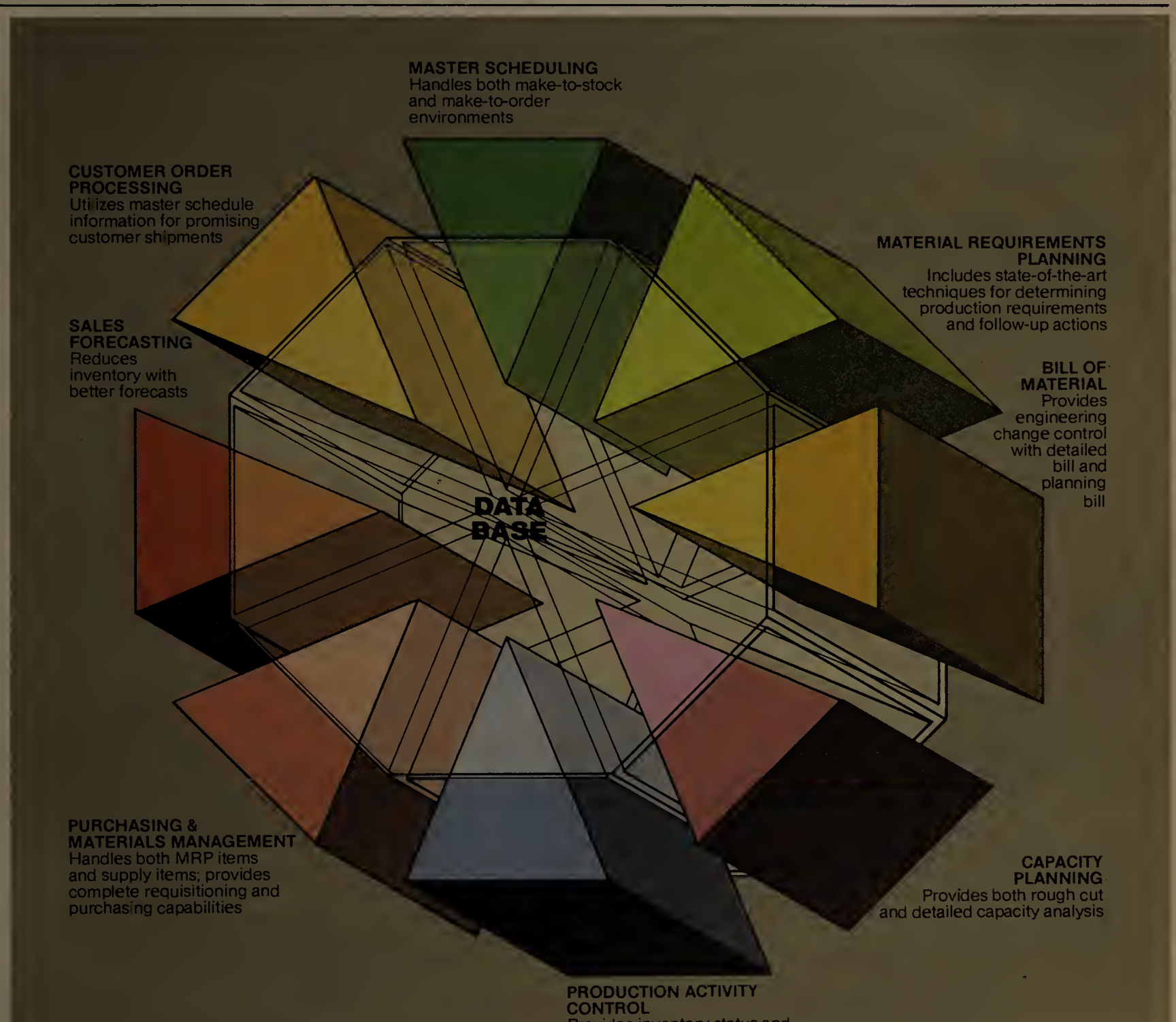
Since acquisition of a CAD/CAM system may mean the expenditure of as much as several hundred thousand dollars, the following guidelines are suggested for use by anyone evaluating a CAD/CAM system purchase:

- Develop an engineering signature for your company. Take inventory of present drafting, design and engineering tasks. Develop a list of drawings by discipline and category. Be as detailed as possible in listing the categories of drawings under each discipline.
- While developing an engineering signature, also detail a typical work flow. Find out how much actual design effort, drafting effort and revision is required on a project. Is every project started from scratch or are proven designs reworked?

Just performing these two tasks (and they will take a considerable amount of effort) will uncover many procedures within the engineering operation. This approach provides a much clearer understanding of the engineering disciplines within your company that are logical candidates for CAD/CAM.

With engineering signature and work flows well defined, the basis is established upon which to develop cost justification guidelines and productivity improvement analyses. One such approach might be to extract from the engineering signature each discipline and its associated categories and apply expected productivity improvement ratios. This procedure will provide a reasonably detailed preliminary analysis of what to expect in productivity improvement from

(Continued on SR/24)



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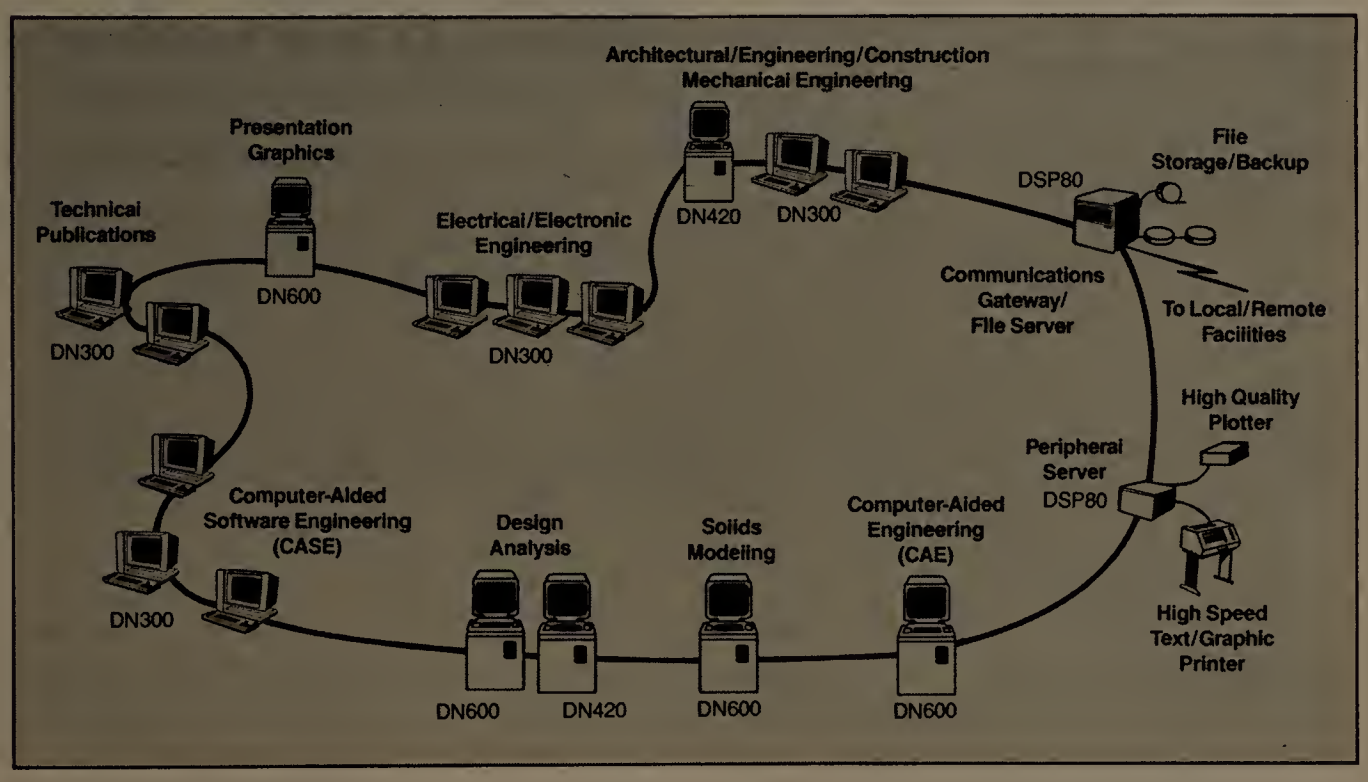
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Domain: The Next Generation

Tired of game playing at computer shows?

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If you want to learn how to select and use the microcomputing products and services that are revolutionizing business. . .

If you're tired of micro shows heavy on video games, but light on the serious applications you need to succeed. . .

EMCE is for you!

The Executive Microcomputer Conference and Exposition (EMCE) is sponsored by the Conference Management Group of CW Communications/Inc., publishers of *Computerworld, InfoWorld, ISO WORLD,* and *PC World.* And it's designed especially for executives who are responsible for the selection or use of micros in their organizations, executives who use micros as decision support tools, and business managers who employ (or want to employ) micros to manage their businesses.

EMCE gives you a complete conference program and exhibition:

- 48 conference sessions
- 3 days of exhibitions
- Hardware/Software selection
- Micros in smaller businesses
- Financial applications
- Special program of personalized instruction
- Future trends
- And much more!

THE CONFERENCE PROGRAM

The Thursday and Friday conference program is divided into four major "tracks," but you are not required to sign up for a particular group of sessions. You may select the sessions you need from any of the 48 sessions available and create a conference program designed to suit your unique information needs. You may even choose to attend one day instead of two if you want. A detailed agenda will be sent to you prior to the conference for your advance planning, so you don't waste a minute!

I. For Executives in large corporations who are involved in using micros in distributed data processing or as standalone executive workstations, the EMCE conference program includes:

- *Keynote: Increasing Corporate Productivity via the Personal Computer* — (Thurs.)
- *The Executive/Professional Workstation* — (Thurs.)
- *DDP with Microcomputers* — (Thurs.)
- *The Information Resource Center* — (Friday)
- *The Role of Apple and IBM in Corporate Computing* — (Friday)
- *New Issues of Confidentiality and Security in Organizational Information Processing* — (Friday)
- *Personal Computer Acquisition and Implementation Strategies* — (Friday)
- *Compatible Systems and Software for the IBM PC* — (Friday)

II. For Executives who are concerned with the selection and use of microcomputers **primarily in smaller businesses,** the EMCE conference highlights:

- *Keynote: The Personal Computer: The Mouse that Roared!* — (Thurs.)
- *How to Buy a Personal Computer* — (Thurs.)
- *Spread Sheet/Financial Applications* — (Thurs.)
- *New and Future Trends in Personal Computing* — (Thurs.)
- *Word Processing Packages for Personal Computers* — (Friday)
- *DBMS on Personal Computers* — (Friday)
- *A Look at Integrated Software Packages* — (Friday)
- *Panel: Executive Personal Computer Success* — (Friday)

III. For Executives who wish to keep up with changing microcomputer technologies in **mass storage, business graphics, operating systems** and more, the EMCE conference highlights:

- *Keynote: The Future of Personal Computer Software for Business* — (Thurs.)
- *What's New in Peripherals* — (Thurs.)
- *Developments in Personal Computer Business Graphics* — (Thurs.)
- *Mass Storage Capabilities* — (Thurs.)
- *Information Utilities* — (Thurs.)
- *Popular Programming Languages* — (Thurs.)
- *Operating System Selection: 8 to 16 Bit* — (Thurs.)
- *Developments in Networking* — (Friday)

IV. For Entreprenuers, Dealers, Distributors and Systems Houses, we'll offer sales and venture capital strategies you won't want to miss. Session highlights include:

- *Keynote: Retail Opportunities in the Personal Computer Marketplace* — (Thurs.)
- *Software Packaging and Distribution* — (Thurs.)
- *Raising Venture Capital for Software and R&D* — (Thurs.)
- *Legal Issues for the Retail Distributor* — (Thurs.)
- *Market Update: Competition from Japan* — (Friday)
- *Successful Training Strategies for Vendors and End Users* — (Friday)
- *Delivering Good Maintenance, Service & Support* — (Friday)
- *Selling the Corporate Account: Problems & Pitfalls* — (Friday)

SPECIAL PROGRAM FOR EDUCATORS

For Educators and Administrators, EMCE will hold a special seminar on Saturday, June 25th entitled *Microcomputers in Education* which includes the following sessions designed to suit the unique needs of education:

- *Keynote: Computer Assisted Instruction in Education*
- *Computer Funding and Acquisition*
- *Logo: An Educational Language*
- *Teacher Training*
- *Administrative Applications for Educational Institutions*
- *Educational Computing at Home*

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1. *Early admission* — only conference registrants and advanced registrants will be admitted to the hall between 11 a.m. and NOON on Thursday and Friday.
2. *$5.00 discount* on admission price at the door.

Register for EMCE now! The Sheraton Centre in New York City is the place; June 23-25, 1983 are the dates. Exposition hours: 11-7, Thursday and Friday; 10-6, Saturday. For more information on the conference and exposition, dial 1-800-225-4698 (In Massachusetts, 617-879-0700) and ask for Louise Myerow.

FREE SATURDAY FEATURE SESSIONS FOR ALL ATTENDEES

FREE Special Feature Sessions for exhibit and conference attendees will be held Saturday, June 25 from 9:00-1:00 p.m. The sessions will focus on professional applications for micros and starting your own home based business or office, and will also discuss the personal computers impact on family life, kids and recreation.

SPECIAL HANDS-ON WORKSHOP

In addition to the main conference program, EMCE will offer a two-day **Executive Microcomputer Workshop** for those professionals who wish to get hands-on experience with an Apple or IBM Personal Computer. The workshop will focus on four specific applications: spreadsheet analysis using VISICALC, data base management using dBase II, graphics and communications. An in-class network will be set-up to demonstrate the communications capabilities of personal computers. The two-day seminar will run concurrently with the EMCE Conference Program and will include admission to the exhibits and special feature sessions on Saturday, June 25. **The Executive Microcomputer Workshop** will be sponsored by the Personal Computer Learning Center of New York City and will be held at the Center, located at 1120 Avenue of the Americas, on Thursday and Friday June 23 & 24. **Enrollment is limited,** so please register early with your choice of hands-on using either an Apple or an IBM PC.

EMCE™

Executive Microcomputer Conference & Exposition

EMCE — Sheraton Centre, New York City June 23-25, 1983

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Includes Complete Exhibit Admission with 11:00 a.m. early admission privilege

- ☐ Full Two-Day Conference Registration $295
- ☐ One-Day Conference Registration $195
  Thursday only ☐ Friday only ☐
- ☐ Executive Microcomputer Workshop $595
  Thursday and Friday
  Choose one: Apple ☐ IBM PC ☐
- ☐ Micros in Education $ 95
  Saturday, June 25

Conference Registrants Only May Register by Phone: Call 800-225-4698, In Mass. call collect 617-879-0700 and ask for Louise Myerow.

REGISTRATIONS CANCELLED later than June 15 are subject to a $50.00 service charge. Registration may be transferred at no charge.

☐ Yes! Register me for EMCE (fill out attached conference form)
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- ☐ Advance Pre-Paid 3 day exhibit registration $20 ($25 at door)
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  - ☐ Thursday
  - ☐ Friday
  - ☐ Saturday

3-Day Exhibit Registration Includes Special Feature Sessions on Saturday, June 25 from 9:00 a.m. to 1:00 p.m.

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U.S. Touts Planning; Japan Emphasizes Control

Planning Systems vs. Manufacturing Control

By Dave Hanks
Special to CW‡

Major emphasis has been placed on manufacturing requirements planning (MRP) systems and what they can do to improve the manufacturer's plight.

At the 1982 American Production and Inventory Control Society (Apics), a special topic of concern was the effectiveness of MRP systems in solving the many operational problems that plague manufacturers.

A major complaint about MRP and business, capacity, tool and distribution requirements planning was that these are merely planning systems and provide little assistance in executing the plan. Their ability to provide a good plan hinges on the accuracy of the data they manipulate. Most MRP experts consider 98% accuracy commendable.

Realistically, however, if a 2% error is made on critical parts, the plan is suspect. Achieving this level of data accuracy is nearly impossible and maintaining it is even more difficult in most manufacturing environments.

Today, manufacturers are focusing on control. Perhaps this explains the high interest in Japan's methods of manufacturing. In Japanese systems, controlling the flow of manufacturing activities takes precedence over planning them. Plans are less likely to be changed in favor of maintaining operational control.

What does control buy? — productivity.

For example, both in the U.S. and in Europe, most of the emphasis over the past 10 years has been on planning systems. In these plants, 95% of the product-build cycle is spent on having parts on the factory floor in wait time or queue time; nothing is being done to them.

In Japan, where the focus has been on keeping the product-build cycle moving with tighter controls (that is, the use of just-in-time systems), inventory turns over an average of eight times a year. In the U.S., inventory averages only four turnovers a year. In the past 10 years, Japan has improved its inventory turnovers from five to eight (60%), while the U.S. has only improved from three to four (33%).

Both groups of manufacturers have automated considerably in the past decade. So what accounts for the significant difference?

Japan has achieved this improvement by focusing mostly on the operations side of the business.

With tighter controls, the manufacturer requires smaller plants, fewer workers, fewer material handling devices and lower investment in all types of inventories. These factors translate into direct savings in manufacturing costs.

Obviously, manufacturers have a considerable investment in their MRP systems and are not going to throw that away. However, many manufacturers have solved the problem successfully by interfacing shop floor control/data collection systems with their MRP systems, thereby leveraging the effectiveness of their original systems. These new tracking systems make up the heart of the factory of the future.

Even this solution is not without controversy. On one side of the issue, there are those who believe the MRP system should be installed first, and on the other side of the issue, there are those who believe the shop floor control system should be installed first. More and more experts are concluding that when starting from scratch, the execution system can be implemented prior to MRP.

Few integrated solutions are available. Manufacturing firms differ radically in their control system requirements. In fact, requirements may differ from plant to plant within the same company. So users must either develop their own control systems in-house or purchase software packages.

In choosing the latter route, users must realize that the packages probably were originally developed for others. Users must evaluate how well the packages fit their needs, how much work may be involved to modify them and the advantages of developing their own custom-tailored systems.

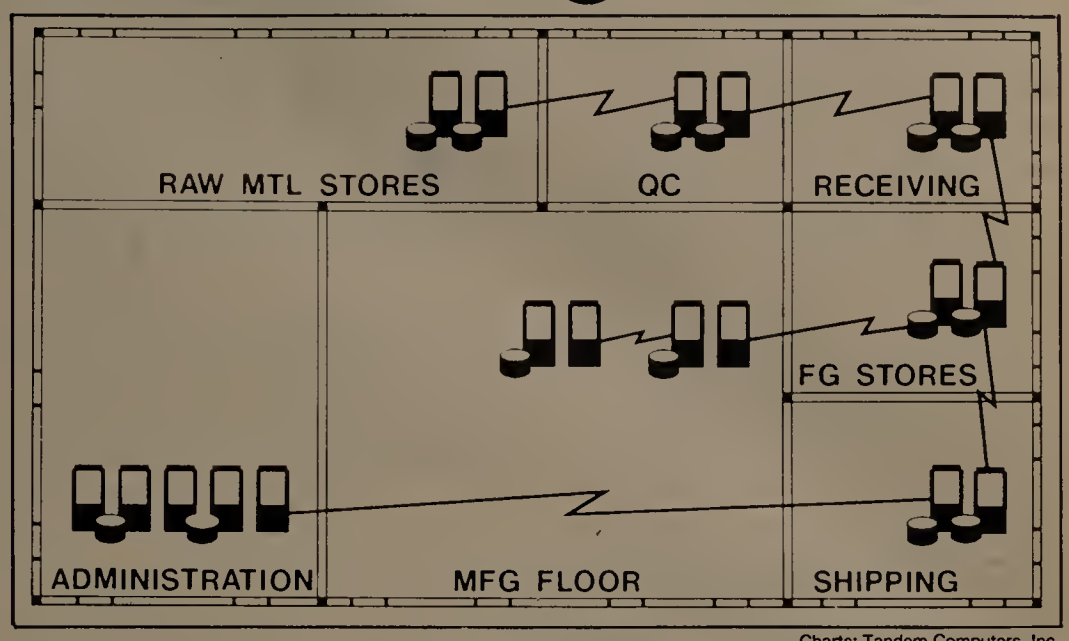
But choosing a manufacturing control system is no easy task, and users should consider a number of criteria before making a final decision:

- **The Need for On-Line Transaction Processing.** Events such as changes in priorities, people, machines, schedules and so on occur continuously. Tracking these events as they occur alerts the operations staff to problems before the production schedule is seriously impacted and allows them to develop alternative solutions based on the present state of operations.
- **Reliability and Uptime.** System downtime can create havoc and cost thousands of dollars per hour. A system that boasts 98% or 99% reliability still translates into 1% or 2% downtime or more if you have a network.

Virtually 100% reliability is a reality, not an unattainable dream.

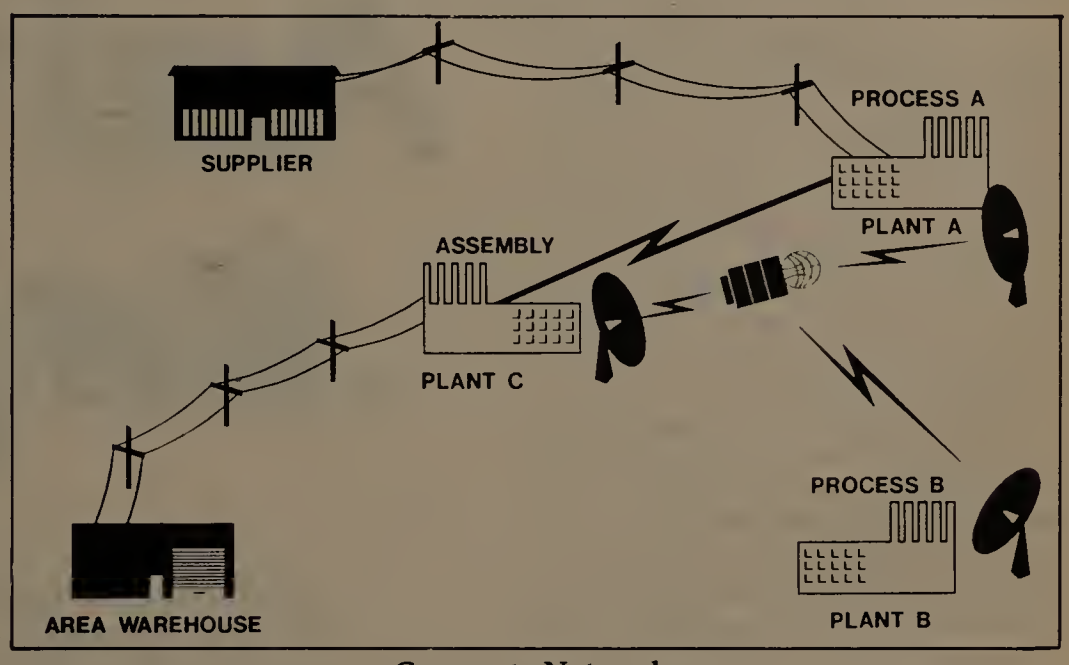
- **Data Integrity.** MRP systems require accurate data to produce valid plans. Likewise, data integrity is critical to manufacturing control systems. Incorrect information as a result of computer errors can cascade throughout the manufacturing control system, causing numerous problems.
- **Easy Expansion.** A good manufacturing control system must be prepared to accommodate growth. One of the drawbacks of minicomputers is their limited capacity. Another pitfall to avoid is that with some vendors, expansion requires purchasing or exchanging the entire system for a larger one and converting the software.

Modular systems are a way of avoiding these problems. The system is sized to meet present requirements, but can be expanded incrementally simply by adding hardware, and it requires no additional programming or changes to existing programs.



Charts: Tandem Computers, Inc.

Factory Network



Corporate Network

- **Networking.** Several Apics speakers endorsed the "island" concept in which companies install islands of automation and then integrate them together.

The factory of the future will embrace many new manufacturing methods, tools and technologies. These include robotics, automated vehicle-guidance systems, group technology and paperless documentation.

As the U.S. moves from the industrial age into the information age, manufacturing control systems will be a key management asset for achieving higher productivity and profits in the factory of the future.

Hanks is a manufacturing marketing specialist for Tandem Computers, Inc., located in Cupertino, Calif.

6 out of 7 MRP systems FAIL



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CAD/CAM Systems Need Proper Management

(Continued from SR/19)
your CAD/CAM system.

Armed with the engineering signature, work flow descriptions and some preliminary improvement ratios, continue investigation of CAD/CAM feasibility for your company.

When the preceding steps have been accomplished, discuss the preliminary findings with top management in order to obtain approval to proceed further.

If the findings are approved, begin discussions with vendors about your needs. Since a fair amount of up-front work has been done, most vendors will be in a better position to understand the requirements. However, it is useful to have them confirm the findings.

After speaking to several vendors, each vendor's product may seem to fit your needs. Perhaps questions will remain as to whether two-dimensional, three-dimensional or solids modeling are essential to your needs.

At this point, it may be useful to obtain the services of a qualified consultant to assist in formalizing requirements into a Request for Proposal, evaluating vendor responses and developing an implementation plan.

When thinking about implementation, start with the easiest functions; they will provide the most success in the shortest period of time. This will also serve as a benchmark comparison of the productivity estimates provided to management.

Time for Training

The system will only be as good as the operators. Be sure to allocate a reasonable amount of time for training and familiarity with the system. Do not expect improvement overnight. The typical time frame to reach a 1:1 productivity level is about four to six months, with another four to six months to reach projected productivity levels. This, of course, will vary based on the project's complexity. Operators should be committed full-time.

Another key element in the success of the system is selection of a system supervisor.

The above-mentioned tasks are by no means exhaustive, but merely provide a starting point for evaluating the benefits of CAD/CAM within your company and the tools available in the marketplace.

Bock is a partner of Verbit & Co., a management consultant firm in Bala Cynwyd, Pa.

Small Business Needs MRP Plan

(Continued from SR/18)
agement must select an appropriate MRP package. Should a highly complex program be chosen, however, too much staff time will be wasted inputting nonessential data and reviewing irrelevant reports. Without the benefit of extensive middle management to analyze the reports and take constructive action, the small company cannot profit by the sophisticated MRP system.

Conversely, an MRP system that is too simple will fail to provide substantially different information than that which is already being produced by hand. The reports may look nice, but they will not address the critical problems for which the MRP system was purchased.

Halbert Corp., with gross revenues of $135 million, makes production runs of 500,000 items and experiences considerable and predictable spoilage of several component parts. This company could benefit by an MRP system that tracks spoilage through the manufacturing process, thereby providing more effective inventory tracking and costing.

Major Tech, with gross revenues of $6 million, makes production runs of 5,000 and experiences spoilage from time to time. An appropriately scaled MRP system will track spoilage at finished goods only. If just 4,500 items of the production run pass inspection, spoilage is calculated at 10%. Tracking spoilage throughout the entire manufacturing cycle would conserve staff time and system overhead.

An MRP system can substantially benefit the small manufacturer provided it is properly chosen. MRP programs can also provide management with comprehensive and flexible planning tools.

The small manufacturer who experiences large variations in customer orders and needs can use MRP to recalculate planned inventory purchases and reorder manufacturing priorities on a daily basis if required. Not only can this help management to expedite orders, it can free management to spend more time in planning and less time in crisis control.

Sarkissian is an account manager with Western Business Computers, Inc. in Los Angeles.

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3. Your management would commit to changing corporate information systems if they were convinced that a new system would work better.

With Manufacturing Accounts System

Electronics Parts Maker Jolts Service Levels

AMES, Iowa — A manufacturing accounting production system has helped an electronics component maker to achieve higher inventory accuracy and increased service levels.

Bourns, Inc. is a major participant in the electronics component industry. Its facility here is part of the company's Trimpot Division, a manufacturer of potentiometers (variable resistors).

The facility manufactures piece parts for distribution to Bourns' assembly plants around the world. The plant's secondary responsibility is to assemble high-reliability military-specifications potentiometers.

The facility utilizes state-of-the-art technology for high-speed, high-volume and close-tolerance manufacturing, including mechanized equipment that is engaged in thick-film printing, plastic molding, metal stamping and forming and mechanical and electrical bonding. The 83,000-sq-ft facility employs 750 people and operates on a three-shift, five-days-per-week basis.

Bourns' application of Compuserv Corp.'s Advanced Manufacturing Accounting Production System/3000 (Amaps/3000) is unique. Operating on Hewlett-Packard Co.'s HP 3000, it drives material requirements planning (MRP) with firm customer orders, as opposed to a master schedule.

Because of the limited planning horizons provided by the firm's customer orders for material, Bourns also must use a reorder point for inventory control. This is because the visibility for up-and-coming requirements is only about one-half that of raw material or component procurement time. In order to cover that period, Bourns uses a reorder point.

Scheduling practices are such that the company utilizes the lead time override feature in Amaps/3000 to correspond to a weekly schedule release whereby all orders within a schedule are due on the same day. Because of the cyclic nature in which work is released, a regenerative MRP is run on a weekly basis, as opposed to a net change daily operation.

According to Frank Pipitone, materials manager of the facility here, "We are a high-volume job shop. In a given month, we manufacture 75 million piece parts and approximately 300,000 assemblies.

"We have 10,000 item masters, 16,000 product structures, 19,000 demand records, 8,000 supply records, 167,000 operation descriptions and 61,000 operation designations. Bourns' sales are about $250 million," he said.

All finished goods are ordered by and shipped to Bourns' Riverside, Calif., plant. The Riverside facility then distributes finished goods and assemblies from its central warehouse. The Bourns assembly plants order piece parts directly from the Ames plant, which ships them out to the other plants.

Modules Installed

Modules from Amaps/3000 have been installed. The modules include the bill of materials system (BMS), material control system (MCS), MRP, process and routing system, shop floor control and capacity requirements planning. BMS, MCS and MRP were installed and utilized by August 1979; by mid-1980 the remainder of the modules were implemented.

Prior to the Amaps/3000 installation, the facility here did not have a formal cycle program. A physical inventory was the only means available to measure accuracy. Prior to August 1979, the facility averaged a 2% to 3% adjustment, measured in total dollars.

The current level of accuracy is measured in two ways: a formalized cycle-counting program and a physical inventory. The cycle-counting program indicates that the facility is running at 99%-plus accuracy with zero tolerance. The latest physical inventory showed that the facility had storeroom inventory in excess of $1.7 million, and it had a total net adjustment of $170,000. The facility physically inventoried 4,000 storeroom items, and only 12 required an adjustment.

It is important to note that due to the buying size of the facility's products, everything is weigh counted — each lot is broken down into small bag quantities with an individual ID ticket indicating the count. The inventories and cycles tally up to the total counts on individual lots, as opposed to reweighing the count within each lot.

The facility has successfully re-

(Continued on SR/26)

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Electronics Company Moves Assembly Line

CLEVELAND — Until a few years ago, Keithley Instruments, Inc. here experienced the traditional problems associated with assembly line production.

Production techniques were inefficient, employee communication was lacking, product quality fell short of targets and, according to John Juris, information services manager, there were "glaring examples of inventory shortages where assembly didn't have the parts they needed when they needed them."

At that time, Mark Frohman, vice-president of human resources, joined the company and introduced a team manufacturing concept involving the techniques associated with production work cells and quality circles from which Japanese manufacturers have benefited in recent years.

Needed to Improve DP

Furthermore, the company had reached the point where it needed to improve and update its data processing capabilities. Keithley could either stay with its IBM System/3 in the batch mode and rework its already customized software or replace it with new on-line software and different hardware.

The company chose Martin Marietta Data Systems, Inc.'s on-line MAS Manufacturing Control System with a Hewlett-Packard Co. HP 3000 computer to work in conjunction with the development of its new manufacturing philosophy: team work centers.

Greg Bigadza, general manager of the Instruments Division at Keithley, claimed, "It was the combination of what the computer system and MAS manufacturing software provided plus the new management discipline which brought us to the level we are today."

But where is Keithley today? And,

Electronics Parts Firm Ups Service Levels With System

(Continued from SR/25)

duced taking physical inventory to only twice a year. "We feel confident that at least storeroom physical inventories will be eliminated within the next year. Our last physical inventory showed that we have 4,000 items in stock. It is possible that at any given point, we stock up to 8,000 items of the total 10,000.

"We process approximately 50,000 MCS transactions into the system per month. We process to stock and issue to the floor about 2,500 work orders per month. Our labor collection system processes about 100,000 shop floor control transactions each month," Pipitone continued.

The source document that is used for transactions into Amaps/3000 has become the same source document used by accounting to post its ledgers. Previously, a "flash" copy of the receiver went to accounting to address a timing consideration on receivers that were coming from outside vendors. Accounting booked inventory on the flash copy.

Often there was a delay between putting the receivers into stock and when accounting received the flash copy, and there was a count difference between what was put into stock and what count appeared on the receiver. The new procedure has eliminated these discrepancies.

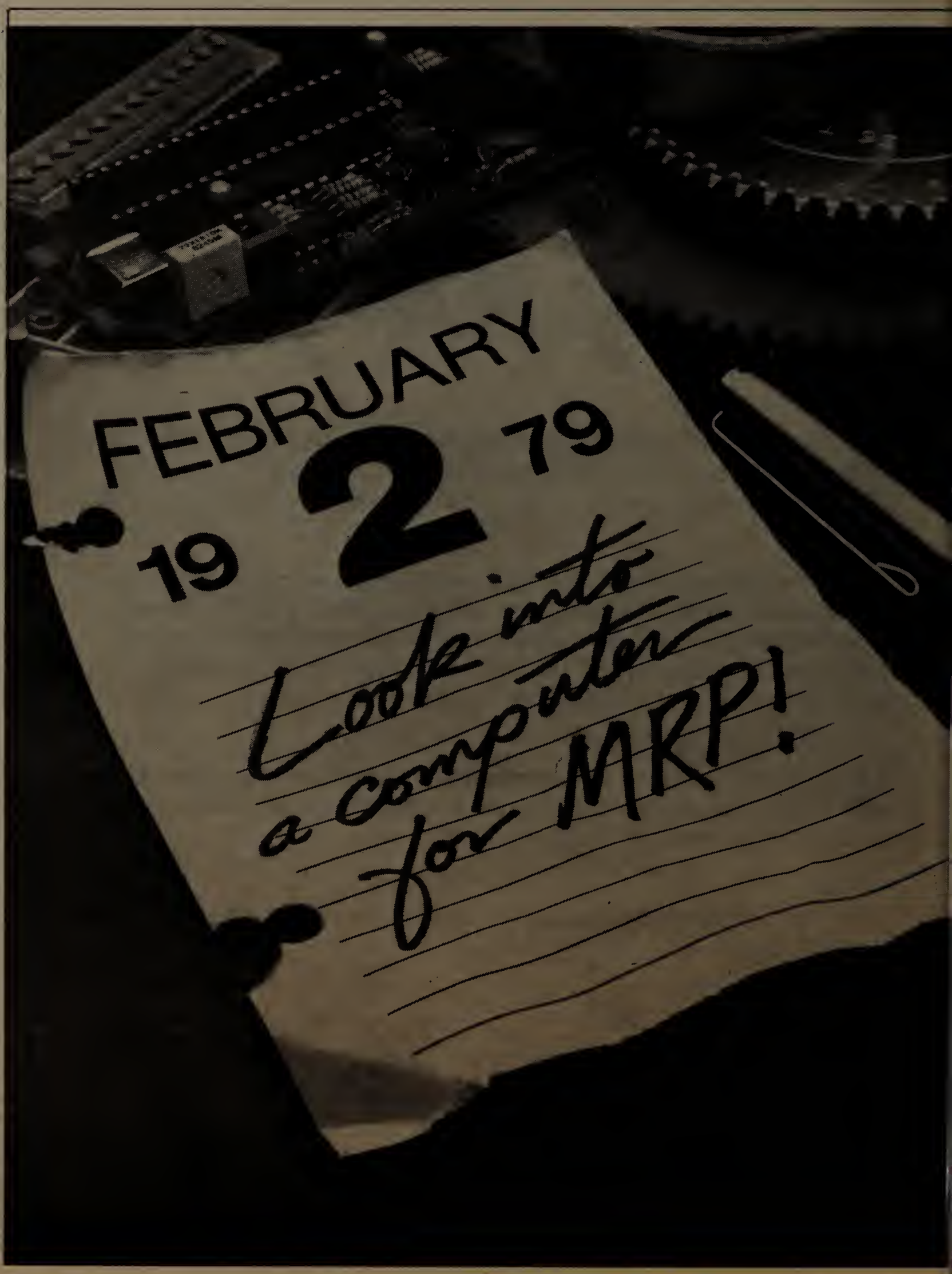
In the past six months, accounting has used the source document for an audit, as opposed to posting from the source document. A daily transaction register is utilized for posting.

"This procedure has put us in sync in terms of both the commonality of the transaction and the timing," Pipitone said.

"In addition to higher inventory accuracy, our service level is greater. For example, prior to the Amaps/3000 installation, our service level was approximately 92% to 93%. We're currently averaging between 96% and 97% delivery performance against our delivery commitment.

"We've also reduced inventory investments while increasing our sales volume. Our inventory turns are currently averaging 10, compared with an average of about eight in the preinstallation period," according to Pipitone. During the first year of Amaps/3000 operation, the total inventory was reduced about 30%.

"Our overall service level has improved not only in terms of delivery, but in terms of the amount of information that is available and the speed in which we can gather that information and respond to it. Primarily because of the data base, we have much better and faster management information," Pipitone said.



By Implementing Team Work Center Concept

more importantly how did it get there?

Keithley Instruments designs, develops, manufactures and markets electronic measuring equipment. Products are sold principally to research laboratories in government, industry and educational institutions around the world.

Before the transition, Keithley used the traditionally separated manufacturing departments of component preparation, assembly, inspection, calibration and test. With its original assembly line production floor plan came the traditional manufacturing time wasters and aggravations such as tracking down the production status of a particular order from the assembly station to the shipping area.

Now the various functions are performed in one work center; team members follow their product from start to finish. Whatever information a manager needs about the status of Product A will be found at the team work center responsible for Product A. This allows the manager to get information faster and more efficiently.

Before Keithley beta-tested its first product team in October 1979, it established three primary objectives:

improve productivity, quality control and labor relations.

Results of the beta test were positive, and three months later the company converted the balance of its production area into team work centers.

Today, 12 product-oriented teams compose the work force responsible for the manufacturing of six product categories: scientific instruments, bench instruments, programmable instruments, hand-held instruments, system subassemblies and accessories. An average-size team of 12 is composed of eight assemblers, two inspectors and two technicians.

The product teams are responsible for setting their own goals; they hold team meetings to discuss how to work better together, make the product better and improve quality and efficiency.

How has the increased responsibility affected the employees' attitude toward the company? Overall, the employees feel a greater responsibility toward the quality of their product and a greater loyalty to Keithley.

Control Provided

The on-line MAS manufacturing system provided the control Keithley needed to ensure the success of its new team manufacturing philosophy.

With the transition to the team work center philosophy, the need for standardizing both product-related and managerial procedures was more critical than ever. According to Juris, the implementation of Martin Marietta's system "forced Keithley to document procedures and implement disciplines." This gave the company the solid management foundation it needed to make the team concept work.

The fact that the MAS manufacturing system was on-line (as opposed to batch) allowed material control to update files instantaneously. This, according to Bigadza, "was a definite factor in the increased productivity level. Since users are actually interacting with the computer, they feel a part of it; they are more aware of the impact of an error and know they have to change it instantly. There has been a marked improvement in the accuracy of reporting data."

Inventory Control Benefit

However, the key benefit of the manufacturing system to Keithley is inventory control. This function provides critical support to team work centers: Inventory is available when needed. Consequently, inventory efficiency was increased. Inventory cost was reduced $550,000 from 1981 to 1982, while inventory turnover rose from 1.8 per year to 2.14 per year.

Team members seem to feel a greater sense of responsibility for the bottom line. There has been a 48% reduction in areas of supervision, scrap and rework. One employee explained, "We fight to get a quota and beat it."

Their attitude has been supported by the Master Production Scheduling and additional control capabilities in the manufacturing system.

As a result, productivity increased 21% one year after implementation of the system and team concept. Furthermore, Keithley's quality audit rating (at first production test) increased from a low 80% range in 1980 to 95.5% in 1982.

Keithley executives are establishing new objectives with input from team members.

Soon, all stock transaction entries will take place in the stockroom. This will decrease the "paper passing" and free material control workers to perform inventory analysis.

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First Validated Ada Language System

NYU ADA/ED Compiler Gets DOD OK

By Lois Paul
CW Staff

NEW YORK — New York University's (NYU) ADA/ED translator and interpreter has become the first Ada language system to pass the stringent validation tests stipulated by the U.S. Department of Defense.

ADA/ED received its certificate of validation here last week from Dr. Robert Mathis, technical director of the Ada Joint Program Office (Ajpo).

The validation process took about four days, and the results were analyzed over a week-long period. "We got a notice in computer mail that it had passed all the tests," Robert Dewar, professor of computer science at NYU, reported.

He explained that although ADA/ED is a complete Ada compiler and has passed validation testing, "it really is only suitable for educational and training purposes."

About 350 installations already are using ADA/ED. Most of the users are running a Digital Equipment Corp. VAX/VMS version of ADA/ED that is available from the National Technical Information Service for about $300. Versions of ADA/ED are available from NYU for use on DEC VAX-11 systems running under Bell Laboratories' Unix operating system, IBM's 370 series under CMS and MVS and Amdahl Corp. systems. They are priced at $250 for noneducational institutions and $1,000 for other organizations.

The interpreter has been under development for about three years, under funding from the Communications and Electronics Command of the U.S. Army. Lt. Col. Vance Mall, the Air Force deputy director of Ajpo, said the original purpose of the project was to develop an Ada training facility. "We came to a decision point about a year ago," he explained. "The question was should we tune that to make it fast and more suitable for training, or should we tune it to be very understandable and more suitable for services and operational semantic definitions. We chose the second path because it appeared that its useful life as a training tool would be very short because of delivery of other compilers." His feeling is that the slowness of the interpreter will make it more useful as a familiarization tool than for

(Continued on Page 58)

Programmer Workstation Said To Optimize Use of Modula-2

By Paul Gillin
CW Staff

OREM, Utah — Diser Corp. has announced a hardware/software programmer workstation that is said to optimize use of the Modula-2 fourth-generation programming language.

Called the Modula Computer, the system employs a 16-bit proprietary processor and Medos-2, an operating system written in Modula-2. The hardware was developed in tandem with Modula-2 by a project team headed by Pascal author Niklaus K. Wirth. Procedures are said to be similar to Pascal but with a more systematic syntax.

"Usually a language is confined to existing hardware or operating systems," said Richard Verhaaren, president of Diser's U.S. office. "The Modula Computer was taken from the angle of creating a hardware design that optimizes the software."

The hardware employs a maximum 256K bytes of memory, a microprogram-

(Continued on Page 60)

Dos and Don'ts for Effective Info Center

By Bill Clarke
Special to CW‡

Is there a key to the successful establishment of an information center in a DP installation? In this article, Clarke suggests some dos and don'ts that may help achieve your information center goals.

The information center is fast becoming a viable means for providing end-user departments with direct access to the data they need in their day-to-day operations.

A separate department within management information systems (MIS), the information center is chartered with the responsibility of providing end users with a means for generating their own reports and developing their own applications with user-friendly software tools. Over the past two years, we have spoken to dozens of organizations that have established information centers with varying degrees of success. While organizations differ in the problems they face and the appropriateness of different strategies, the following five dos and don'ts seem to apply to all successful centers:

'The information center is a resource that should improve the productivity of the entire organization . . . [and] its expense must be shared by all user departments.'

- Do staff your information center with people who work well with end users.

Don't select a staff based solely on technical background.

The most important attitude to look for in the support staff of an information center is an interest in the business problems of the end users. Most information centers will find that the work load breaks down into four areas:

(1) Obtaining and managing the resources of the information center. Getting the equipment, terminals and communications lines for terminals and establishing a positive working relationship with data administration, operations, technical support and other departments within MIS.

(2) Technical support of end users. Teaching users how to access the system and work with their data using the software packages that are available.

(Continued on Page 56)

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TECHNALYSIS CORPORATION

Boole & Babbage Aids Get MVS/XA Support

SUNNYVALE, Calif. — Boole & Babbage, Inc. has announced support for the operation of its software products under IBM's MVS/System Product Version 2, Extended Architecture (MVS/XA).

The vendor's Control/IMS, Control/IMS Realtime, Resolve, Secure and Control/SMF are currently running under MVS/XA. Other software packages close to conversion include CMF/Monitor and TSA/PPE. Boole and Babbage's architectural product lines, Capacity Management Facilities and IMS Management Facilities, will also be supported under MVS/XA, a vendor spokesman said.

The price of the products will remain the same with the conversion, a company spokeswoman said. The price of Control/IMS is $27,500, Realtime costs $36,000, Resolve costs $12,500, Secure costs $15,000 and Control/SMF costs $10,000.

More information is available from the vendor at 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

How to Establish an Effective Info Center

(Continued from Page 55)

(3) Winning the confidence of the end users. Involving promotion and follow-through on end users' requests for data.

(4) Day-to-day administration. Setting up user identifications, billing, ordering user reference manuals, scheduling training sessions and so on.

Depending on the size of the information center, these four functions become the essential job descriptions of the information center staff. Only one requires a high degree of technical experience — obtaining and managing the resources of the information center. This function, usually given to the manager of the information center, should be assigned to a more senior technical person who has shown a knack for creativity, resourcefulness and an ability to motivate a staff. He should also have a reasonable amount of common business sense.

• Do charge users for the services provided by the information center.

Don't become simply another overhead expense for MIS.

The information center is a resource that should improve the productivity of the entire organization. While it resides within the MIS function, the information center should stand apart from it enough to be recognized as an independent department whose mission is to assist non-MIS users with their data. As a companywide resource, its expense must be shared by all user departments.

• Do actively promote and market the services of the information center.

Don't wait for end users to come in with applications.

The information center is a business within a business. It is in competition with a variety of other alternatives end-user departments can seek out to get their work done. These include personal computers, outside time-sharing services and even their own stand-alone minicomputers that perform word processing and data handling.

Unless the information center is seen as a better alternative, it will not fulfill the tremendous potential it has to improve the productivity of the organization. To promote the benefits to end-user departments, the information center staff can develop promotional materials, including a slide presentation, brochure and end-user newsletter; give frequent demonstrations and hold internal seminars; and publicize success stories throughout the organization.

• Do select software that is easy for non-DPers to use.

Don't select software simply by price and blind checklists.

Ease of use is the most important criterion for choosing software packages for the information center. The market for user-friendly software appropriate for the information center is one of the fastest growing sectors of the software industry. New packages are coming on the market that offer a surprising range of capabilities and ease of use.

The old familiar names may not offer the best choice for your end users. Traditional methods for selecting software by number of installed copies, weighted checklists of features and price should be intelligently applied, but the overriding consideration is how well it can serve the needs of your end users. End users are not programmers, and the features they need will differ. Try the package yourself. Have a group of typical users speak with the vendor and test the candidate package for themselves.

• Do maintain an inventory of query files for end-user access.

Don't allow users direct access to production data files.

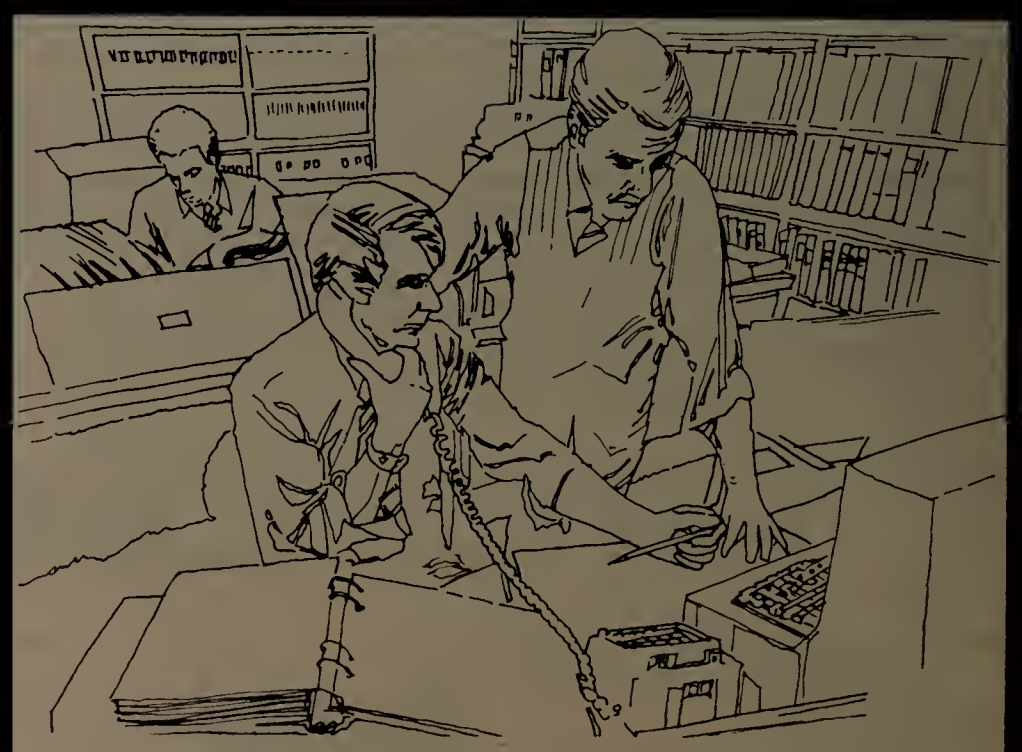
Opinions on this issue vary. There may be instances in which a user requires up-to-the-minute currency, but in general, most users are better served by providing an extract of the live production files.

The advantage of using extract files is that users can be provided with "clean" data in a standard format that will lower the risk of misinterpreting their results. When an extract of the production file is taken, data values can be put in a standard format, obsolete fields can be stripped off, control totals can be checked to ensure accuracy and various computations can be performed as requested by the user.

In many ways, establishing a successful information center is like establishing a new service business. The chief difference is that the marketplace is within one organization and all its users work for one company.

Clarke is senior product manager for National CSS, Inc. in Wilton, Conn.

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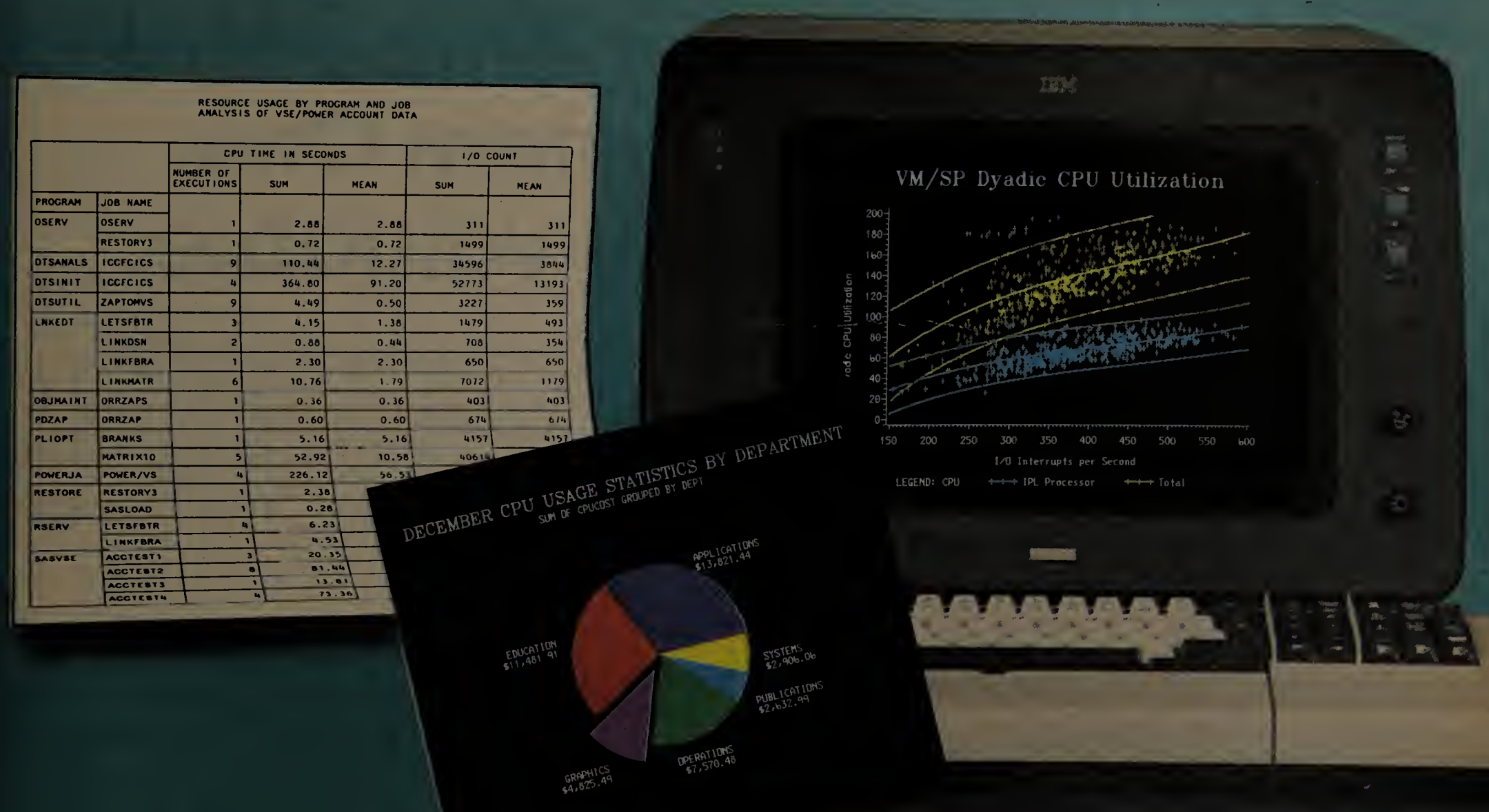
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NYU Gets Other ADA/ED Benefits

The fact that its ADA/ED interpreter and translator was certified last week as the first validated system for the U.S. Department of Defense-sponsored Ada language was not the only good news for New York University (NYU).

The ADA/ED validation process provided another benefit in serving as a successful test for a software prototyping technology that had been under development at NYU for nearly 14 years. The high-level language called Setl, which is based on mathematical set theory, was used to write the ADA/ED interpreter.

Robert Dewar, professor of computer science at NYU, explained that "the [Ada] language was changing pretty rapidly up until a couple of months ago when the standard finally appeared. Because we were working at a very high level, we could keep track of those changes." He added, "These prototyping technologies — at least the ones we have here — are going to be a very practical kind of thing because the total resources we have had on this project have been a small fraction, for example, of what Softech, [Inc.] has spent on their production compiler which, of course, isn't finished yet."

ADA/ED Gets OK

(Continued from Page 55)

training in the Ada language.

ADA/ED is the only government-sponsored Ada system expected to be validated this year, Mall said. The Ada Integrated Environment that is being developed by Intermetrics, Inc. is scheduled to deliver a validated compiler in 1984. The same schedule is in effect for the Ada Language System being developed by Softech, Inc. under U.S. Army funding. Both are production compilers.

"It will be sometime after that delivery before production use of Ada will start happening using those systems," he said, noting that some commercial firms may deliver Ada compilers earlier than the government-supported efforts. Two of the firms that are expected to submit compilers for validation during 1983 are Western Digital Manufacturing, Inc. and Rolm Corp.

"It is not our intention currently to compete in any sense with the production compilers we expect will eventually appear," NYU's Dewar said.

Dewar added, "The validation of ADA/ED shows that it is technically feasible to produce a compiler that meets these very stringent conditions laid down by the test. It will be harder for a production compiler to meet the standards that we have met precisely because they are more concerned about efficiency, and that makes programming much more complicated. But nevertheless, we know it is technically feasible now."

Psychologically, the validation of ADA/ED is a very big boost for the Ada development program, he added.

Further information about the DEC VAX/VMS version of ADA/ED is available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Va. 22161. Information about NYU's versions of ADA/ED is available from Robert Dewar, Computer Science Department, New York University, 251 Mercer St., New York, N.Y. 10012.

Cambridge's A2 Family Supported by MVS/XA

LOS ALTOS HILLS, Calif. — The Cambridge Systems Group, Inc. announced that each of its A2 family of products is immediately available and supported under IBM's MVS/XA operating system.

The products include Automated Data Center System, a job scheduling and monitoring system, which can be purchased for $42,000; Automated Space Management System, priced at $19,500; and Access Control Facility System (ACF2), a computer security software package for IBM MVS and VS1 operating systems, available for $27,000. ACF2 was developed by SKK, Inc. of Rosemont, Ill.

More information is available from The Cambridge Systems Group, 24275 Elise, Los Altos Hills, Calif. 94022.

How Cromemco makes its System One doubly valuable.

The Cromemco System One gives you all the versatility and performance you need to tackle the most complex computing problems.

Dual microprocessors give you a 68000-based machine that also runs Z-80 programs. The 68000, with its 32-bit architecture, gives you superior processor capabilities and is supported by an extensive line of high level software. The Z-80A lets you use the largest base of existing application software available. Now you can get the best of both worlds in one integrated, expandable, low-cost system.

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PL/I Language Extension Targets IBM Compiler Users

CARPINTERIA, Calif. — A PL/I language extension from Silverback Software Co. is said to give users of IBM's Optimizing and Checkout PL/I compilers use of the dynamic allocation facilities of the MVS operating system.

Plidyn extends the PL/I language with the addition of the DYNAMIC statement and a new condition, DYNALLOC, which allows the programmer to allocate, unallocate, concatenate and deconcatenate data sets at execution time.

The DYNALLOC condition is raised if an error occurs during processing of a DYNAMIC statement.

Plidyn is available immediately under a perpetual license agreement for $2,000, including one year of maintenance. The vendor is located at 4193 Via Marcina, Carpinteria, Calif. 93013.

UAP-Link Line Expanded for TSO

TUSTIN, Calif. — Unique Automation Products, Inc. has announced expansion of its UAP-Link software products line to include support for IBM's TSO operating environment.

Designed as an alternative for installations planning to link to IBM with Remote Job Entry or IBM 3270 techniques, the IBM/TSO module included with this release of the UAP-Link family is said to permit the IBM Personal Computer, Digital Equipment Corp. minis running under the RSX and RT operating systems and S&H Computer System's TSX-Plus operating system, as well as UAP's VT180 computers and the Osborne Computer Corp. microcomputer to transfer error-free binary or text files with the IBM through standard RS-232 asynchronous ports.

Additional features include single-user control, data compression, file protection, command files and remote message display. Terminal mode support includes: half/full-duplex, parity format, programmable transmission rates, XON/XOF and diagnostic commands.

The IBM/TSO module, available in May, costs $1,500 from the vendor at Suite G, 15401 Red Hill, Tustin, Calif. 92680.

Xerox Offers Report Tool

LOS ANGELES — Xerox Computer Services has announced a decision support system available on timesharing or as a package running under IBM VM/CMS or MVS/TSO operating systems, Honeywell, Inc. Level 66 with the CP-6 operating system and Digital Equipment Corp. VAX-11 running the VMS operating system.

Called Control, the package is prompt-driven and interactive. It can be used for consolidating, modeling and reporting by end users with little data processing experience, a spokesman said.

Capabilities range from simple reporting to what-if analysis. Standard reporting is provided with a library of 17 commonly used formats. Custom reports can be designed by answering questions about data format. Data can be tracked for all organizations, automatic consolidations may be performed and reports produced in summary or detail. The package can be interfaced with most general ledger packages, the spokesman noted.

Control converts any data to a graph in any one of 10 standard graphics layouts. Modeling procedures allow a model to be constructed and modified as the validity of the modeling process is assessed.

The basic package costs $60,000 from Xerox Computer Services at 5310 Beethoven St., Los Angeles, Calif. 90066.

PDP-11s Get Sort Utility

DUBLIN, Ohio — The System Performance House, Inc. has announced a sort utility for Digital Equipment Corp.'s PDP-11 series operating under RSTS/E.

Spsort is said to be able to sort a file onto itself using no scratch space except for a five-block command file.

The price of Spsort starts at $850. More information is available from System Performance House at 5522 Loch More Court, Dublin, Ohio 43017.

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Programmer Workstation Out for Modula-2 Language

(Continued from Page 55)

mable bit-slice processor, 16-bit CPU bus and a bit-mapped high-resolution display of up to 832 pixels by 640 pixels. It features multiple-window graphics, digitized imaging and input provided by a keyboard and a mouse.

The Medos-2 operating system, compiler, utility programs, device handlers, graphics interfaces and library modules are all written in Modula-2. The operating system consists of a linking loader, file system and routines for keyboard input and text output to the display. The modules can be ported to any program, and the operating system can be modified using Modula-2, Verhaaren said.

Introduced two years ago, the Modula-2 language "semantically but not syntactically" is a superset of Pascal, according to Richard Ohran, vice-president of research and development for Diser.

Ohran said the language improves upon Pascal in several areas:

- Programs can be modularized and split into a definition part and an implementation part.
- A more systematic syntax eases the learning process. Every structure starting with a keyword also ends with a keyword.
- Programs can be compiled separately.
- The language contains constructs for handling multitasking applications. A co-routine concept allows the programmer to set up two different tasks and swap register sets.
- Procedures can be dynamically assigned to variables.
- Low-level facilities make it possible to breach rigid-type consistency rules and to map data with Modula-2 structure onto a store without inherent structure.

The language is structured to encourage the use of modular software, he explained. Routines are stored in a library for building applications and each module is accessible by definition and implementation. Verhaaren likened the concept to an M&M candy, in which "all that messy information is located inside a sugar shell. After the first time you only have to deal with that shell," he said.

The Modula-2 compiler incorporates error detection at the syntax level and a debugger with multiple window capabilities. The facilities identify inconsistencies in the program and flag the user back to the definition where the error occurred, Verhaaren said.

The hardware offers high-resolution graphics input, screen display and output, allowing the Modula Computer to be used for graphics, text editing and document processing. A variety of type fonts are available. Input can be digitized and manipulated using a mouse.

Workstations can be configured in a local-area network under Xerox Corp.'s Ethernet.

A typical configuration costs between $21,000 and $25,000 from Diser at 385 E. 800 South, Orem, Utah 84057.



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IBM System/34 Gets Data Manager System

MALIBU, Calif. — A data management system for the IBM System/34, said to speed disk accesses by 300%, has been announced by Amalgamated Software of North America, Inc.

Acceler8 reportedly eliminates the need for Keysorts, File-rebuild, Overflow Indices, Core Track Indices and Ifile.

The product is said to be transparent to the user and to require no programming changes.

Acceler8 costs $150/mo per installation from the firm, which can be reached through P.O. Box 1068, Malibu, Calif. 90265.



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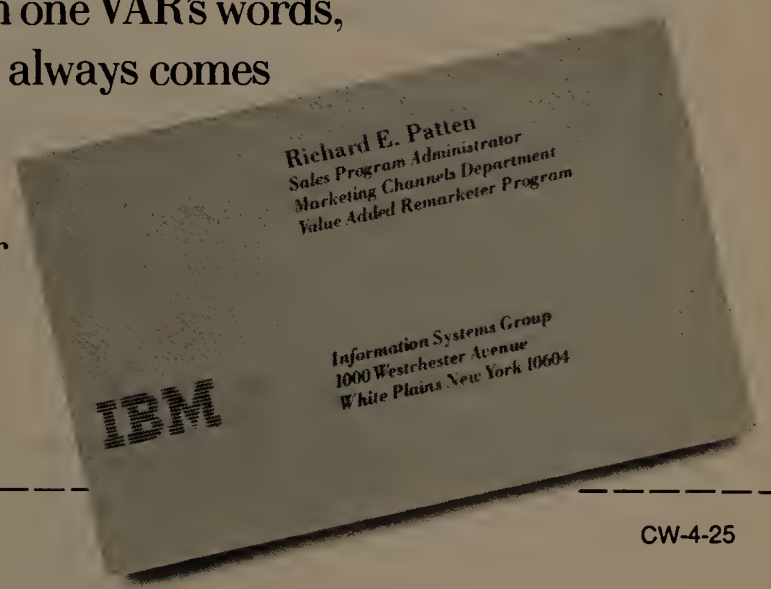
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Fastnet Uses Critical Path Analysis

TORONTO — I.P. Sharp Associates recently announced the availability of a project planning system based on network analysis and critical path techniques.

Fastnet uses critical path analysis, a method of representing the planning details of a project using a network diagram. It may be used on a time-sharing basis or installed on the user's computer running Sharp APL.

In addition to critical path analysis, features of Fastnet include aggregation and scheduling of resources and simple cost analysis. Fastnet's reporting and graphical facilities can be used to present the whole or selected parts of a planning network as a network diagram, annotated by selected information from the network calculations or the activity data, a vendor spokesman said.

Time-sharing charges for use of Fastnet are $1/hour connect time, 70 cents/thousand characters transmitted or received and 25 cents to 45 cents/CPU. In-house installation charges for sites running Sharp APL are $15,000 perpetual license fee and $1,500 annual maintenance fee or $600 monthly license fee.

More information is available from the vendor at Suite 1900, 2 First Canadian Place, Toronto, Ontario, Canada, M5X 1E3.

MCBA Ups Dibol Writer

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has announced Release 2 of its Report Writer package written in Digital Equipment Corp.'s Dibol.

Report Writer allows users to construct, format and print a variety of reports. It allows field positioning and permits fast turnaround time from concept to report, the company claimed.

Sort orders are easily defined and sorts are transparent to the user, thereafter. Arithmetic can be done on fields.

Report Writer provides screen prompting and automatic wraparound if print lines exceed specified page width. The user can specify compiler, operating system and sort. Three printers may be supported.

The package runs on any of MCBA's Dibol accounting, distribution and manufacturing packages. A single license costs $1,500. MCBA is located at 2441 Honolulu Ave., Montrose, Calif. 91020.

'Electronic Spread Sheet' Fits IBM 370, 30 Series, 4300s

LOS ANGELES — Trax, Inc. has announced Electronic Spread Sheet (ESS), an IBM VM/CMS or MVS/TSO package for the IBM 370, 30 series, 4300 series or compatible computers. The package is said to be compatible with Visicorp's Visicalc.

The size of an ESS spreadsheet is said to be limited only by the virtual storage available on the mainframe. The spreadsheet can be viewed in up to four separate windows simultaneously and can calculate values up to 10^{127}.

Program function keys can be used to scroll, switch from one window to another or to get help about the last error message issued, a spokesman said. The spreadsheet is arranged in columns and rows. Each item or location can contain either a textual label or a number or formula.

Arithmetic functions include minimum, maximum, average, sum, count, integer truncation, square root and net present value. Trigonometric functions include sine, cosine, tangent, natural and base-10 logarithms and an exponential function, the vendor said.

ESS is licensed for $220/mo from Trax at 8948 W. 24th St., Los Angeles, Calif. 90034.

'Graphix-11' Produces Bar, Pie, Line Charts

BURLINGTON, Mass. — Texprint has announced a business graphics package for Digital Equipment Corp. PDP-11 and LSI-11 minicomputers under RT-11, TSX-Plus or RSX-11 operating system.

Called Graphix-11, the package produces bar, pie, line and scatter charts and supports dot matrix printers and plotters. It reduces a sequential file to a scaled and labeled chart with no programming, a spokesman said.

The interactive package employs a question-and-answer format. Graphix-11 automatically summarizes large amounts of data and determines the scale of the requested chart, the spokesman said.

A variety of printer/plotter devices are supported, including Texprints's full-color graphics upgrade option Decolor and Decplot for dot-addressable graphics on the DEC LA-120 printer. The software also supports DEC's LA-12, LA-34, LA-50 and LA-100 printers and models from Printronix, Inc., Datasouth Computer Corp. and Anadex, Inc.

The price is $1,095. A complete printer/cable/software package, including an enhanced LA-120 printer costs $4,490 (full-color) or $3,990 (black-and-white). The company is located at 8 Blanchard Road, Burlington, Mass. 01803.

Student Tool Fits Sperry

SARATOGA SPRINGS, N.Y. — Adirondack Systems Associates has announced an elementary Student Accounting and Scheduling System for the Sperry Corp. System 80 series.

The system comprises four integrated components: Student Data Base, Scheduling System, Grade Reporting System and Attendance System. All functions are menu-driven and are performed under Sperry's OS/3 Interactive Services.

The software costs $18,000 from the vendor at RD#6, Jones Road, Saratoga Springs, N.Y. 12866.

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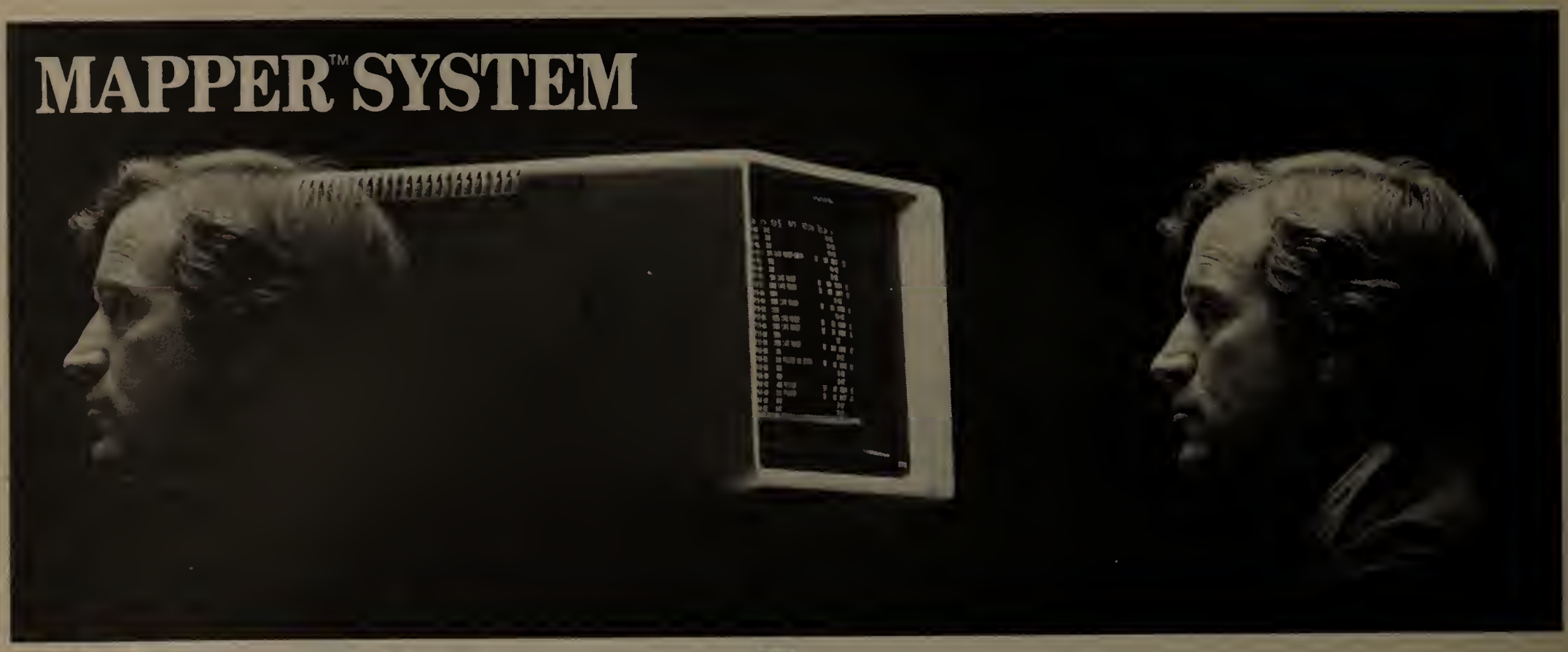
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Interactive Image Process Provided by VSI's 'Gipsy'

SAN JOSE, Calif. — A package that provides more than 200 interactive image processing commands and graphics functions has been released by Vicom Systems, Inc. (VSI).

Called General Image Processing System (Gipsy), the package runs on Digital Equipment Corp. VAX-11/780 superminicomputers and can be used in conjunction with VSI's Digital Image Processing System.

Gipsy consists of stand-alone, high-speed image processing functions including filtering, classification, geometric spatial transformations, neighborhood operations and clustering, a spokesman said.

Any of the Gipsy commands may be combined into a chain-file, allowing users to create image processing algorithms by linking together a sequence of commands.

Identical command sequences can be strung into a file with a standard text editor and executed with a single command name.

Other capabilities include "history records," which are permanent files that indicate every process performed on an image. Gipsy handles single or multiband images in real or integer modes. Bands can be designated as numeric or symbolic. Numberic bands can be operated upon arithmetically. Symbolic bands, containing indexes for categorizing names, can be operated upon with label propagation or Boolean operators, the company claimed.

The package costs $25,000 from Vicom at Suite 318, Oakmead Terr., 1230 Oakmead Pkwy., Sunnyvale, Calif. 94086.

'Flowcharter' Boosted for JCL

SAN JOSE, Calif. — Diversified Software Systems, Inc. has announced Release 2.0 of Flowcharter, a package for IBM OS/VS JCL or compatible systems that creates system flowcharts and other supporting documentation.

The new release is said to allow users to customize JCL flowcharts to their specific requirements. The level of detail can be specified at execution time. Flowcharter has the option to use the IBM 3800 and Xerox Corp. 9700 laser graphics capability.

The product costs $6,995 from Suite 205, 996 Minnesota Ave., San Jose, Calif. 95125.

'Usher' Finance Tool Serves System/38

METAIRIE, La. — Computer Texts, Inc. has announced the Usher financial software package for the IBM System/38.

Usher's applications include general ledger, payroll, accounts payable and accounts receivable.

Before installing each application for Usher, the vendor asks its clients a number of questions about the workings of their companies to facilitate the customization of the package.

The package sells for under $31,000. More information is available from the vendor at Suite 808, 3900 N. Causeway Blvd., Metairie, La. 70002.

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Aids Out for Concept/32

FORT LAUDERDALE, Fla. — Gould, Inc.'s SEL Computer Systems Division has announced two products for use on its Concept/32 family of computers.

The software includes a package of utilities for support of the company's offering of Cincom Systems, Inc.'s Total data base management system and a set of programming utilities for use under Gould's MPX-32 operating system.

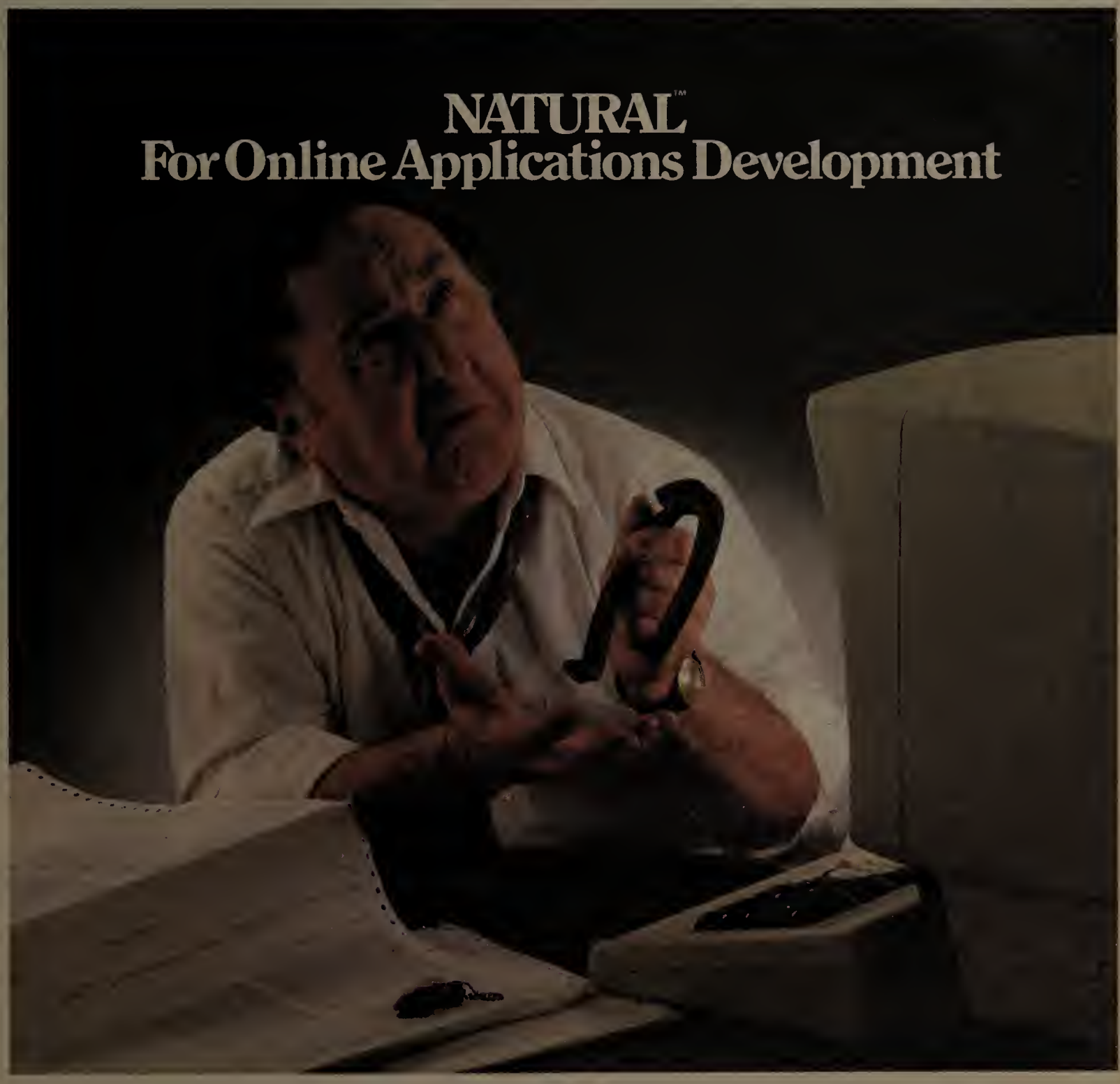
The Data Base Administration/Support System (DBA/SS) enables the Total user to perform initial loading, unloading and reloading of individual data base files, adding and deleting records from data base files and production of data base statistics.

Total data base records can be loaded into a newly created data base on a file-by-file basis without the need for special programs. Records can be added and deleted on an individual basis and a variety of data base statistics are provided. DBA/SS is available for a one-time charge of $3,000.

The MPX-Toolkit consists of a set of integrated editors (stream and full screen), text formatters, macro processors and file manipulation utilities, the spokesman said. Documentation is on-line. The utility is packaged into Gould's Programmers Environment I, which includes MPS-Toolkit, Fortran 77+ compiler, Fortran Formatter and Symbolic Debugger. The entire package costs $16,000.

Gould is located at P.O. Box 9148, 6901 W. Sunrise Blvd., Fort Lauderdale, Fla. 33310.

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Bradford's IDPS Enhancement Fits CDC's Cyber 205, 175, 176

HOUSTON — Bradford Information Systems has announced that an enhanced version of its Interactive Distribution Planning System (IDPS) runs on Control Data Corp.'s Cyber 205 supercomputer, as well as the Cyber 175 and 176.

The version on the Cyber 205 is intended to solve large routing problems for customers, the vendor explained.

IDPS is designed to create optimal routes from multiterminals or shipping points. It can be used in a production mode by creating solutions to truck or vehicle routing problems on a daily or weekly basis. In addition, it may be used in a "modeling mode" to develop distribution "what if" scenarios associated with a variety of parameters and constraints.

Two features of the package are IDPS/Locate and IDPS/Assign. IDPS/Locate determines the optimum location for a distribution center and ranks all points in the network from "best to worst" to serve as a distribution center, the vendor explained. IDPS/Assign determines the best distribution center to serve customer locations or delivery points in a multidistribtuion center environment.

IDPS provides access to a 3,000 city and town data base for input and modeling, the vendor noted. In addition, it is connected to CDC's Cybernet computer network for access via terminals and microcomputers.

The monthly lease for IDPS is $2,000. Other arrangements include paid-up license or computer resource usage basis. The vendor can be contacted through P.O. Box 73111, Houston, Texas 77090.

'Enter/Scan' Serves Execs

ATLANTA — A data management software system for business executives using IBM's System/34, Personal Computer or Datapoint Corp. computers has been announced by Datascan America.

Enter/Scan is said to feature screen "painting," which allows the user to design screen formats and define data fields for information input. The software reportedly allows users with no computer training to create tailored files for collecting and storing information.

Prices range from $1,000 to $4,000 from the firm at Suite 222, 4675 N. Shallowford Road, Atlanta, Ga. 30338.

ISE Cuts Prices On MDBS III

LAFAYETTE, Ind. — International Software Enterprises, Inc. (ISE) has announced price reductions of up to 85% on modules of its MDBS III data base management system.

Prices on the multiuser version running on Digital Equipment Corp. PDP-11 computers and systems supporting Bell Laboratories' Unix and Microsoft, Inc.'s Xenix environments have been reduced 44% to $5,000.

The company can be contacted through P.O. Box 248, Lafayette, Ind. 47905.

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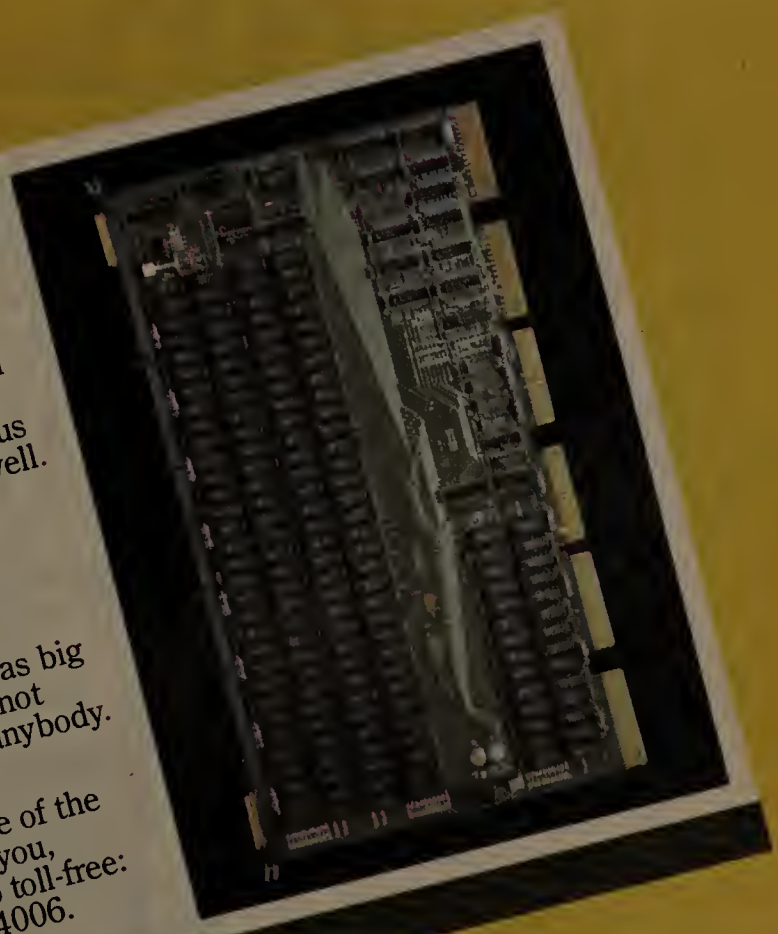
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System Offers File Access From Fortran Programs

SHERMAN OAKS, Calif. — Comp Act Data Systems, Inc. has announced four new poducts for IBM users.

Release 2.0 of the Application CICS Environment System (Aces) allows users to build CICS command-level Cobol programs by answering questions posed by an interactive prompter.

Aces' prompter runs under IBM's CMS, Interactive Computing and Control Facility and TSO; Pansophic Systems, Inc.'s O-W-L and Applied Data Research, Inc.'s Roscoe and Vollie. A license costs $8,500.

Simplified Mapping Support automatically generates CICS screen layouts, IBM basic mapping support macros and Cobol copy member map definitions.

The interactive package runs on CICS and under either OS or DOS and costs $4,500 for a perpetual license.

The Conversion Analysis and Management System is an aid for use in planning and managing a conversion as well as automatically converting DOS JCL and Cobol programs to OS/MVS. A perpetual license costs $22,500.

Facs/OS is an IBM VS1/MVS environment analysis/audit system useful in disaster recovery planning and Isam to Vsam conversions.

A perpetual license under VS1 or MVS costs $4,500.

Comp Act is located at 14849 Magnolia Blvd., Sherman Oaks, Calif. 91403.

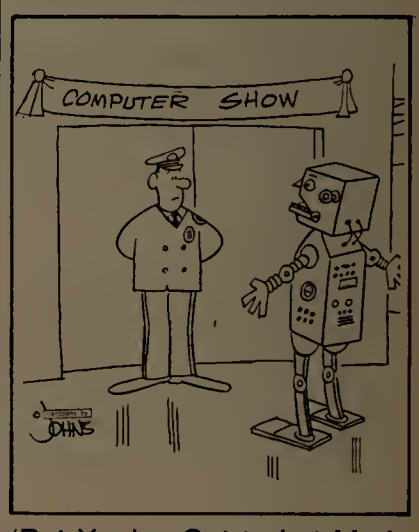
Customer Order Package Out for IBM Mapics Users

ATLANTA — GMD Systems International, Inc. has announced an enhancement package for users of IBM's Manufacturing, Accounting and Production Information Control System (Mapics) order entry and invoicing software.

Customer Order Servicing (COS) is said to include more than 60 functional enhancements to the current Mapics offering. COS is designed to provide servicing and control of customer orders in both manufacture-to-order and volume distribution environments.

Enhancements reportedly include pricing and discounting facilities, immediate invoicing and on-line allocations, expanded warehouse operations support and foreign language/currency capability for export sales.

Available in June, a System/34 version will cost from $5,600 to $11,000, depending on the functions required. A System/38 version is slated for October, a spokesman said from Suite 420, 8601 Dunwoody Place, Atlanta, Ga. 30338.



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It means that you can create sophisticated custom programs based on your existing business forms and office procedures—even if you know nothing about computer programming.

The GRADUATE connects to your Apple, IBM PC, DEC Rainbow or other personal via a universal RS 232 C port, so you need no additional, expensive interface. It will work with all CP/M compatible software.

And the cost of the GRADUATE—even added to the original purchase price of your personal computer—is less than that of most small business systems you can buy.

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Micronotes

The Software Systems Division of Science Management Corp. (SMC) has announced **M-Bos**, its **Multiuser Basic Operating System** for 16-bit microcomputers based on either Zilog, Inc.'s Z8000, Intel Corp.'s 8086 or Motorola, Inc.'s 68000 chips running under any Bell Laboratories' Unix-based operating system. M-Bos reportedly supports up to 16 users and fully supports SMC's Idol, a data base management system that contains a report writer, and SMC's full range of business accounting software. M-Bos costs $795 from the vendor, located at 1011 Rt. 22, P.O. Box 6800, Bridgewater, N.J. 08807.

Ryan-McFarland Corp. has announced the availability of **RM/Cobol** for Microsoft Corp.'s Xenix operating system, which was recently announced for Radio Shack's Model 16. The software costs $199, the vendor said from 609 Deep Valley Drive, Rolling Hills Estates, Calif. 90274.

Daystar Systems, Inc. has announced **Ultraboot**, a dynamic memory allocation utility program for IBM's Personal Computer. The package was designed to allow the user to choose how much memory can be allocated for user programs. The package costs $39.95 or is offered free to buyers of the firm's 512K-byte Ultraram add-on memory, which costs $895. The vendor is located at Suite L, 10511 Church Road, Dallas, Texas 75238.

Insoft, Inc. is offering **Data Design**, a menu-driven relational data base management system for the IBM Personal Computer. Features include Help screens, 26 simultaneous indexes, multiple I/O forms and calculated fields with a post option. The package costs $225, the vendor said from Suite 202B, 10175 S.W. Barbur Blvd., Portland, Ore. 97219.

Durant Software, Inc. announced **Simplifile**, a front-end program for Digital Research, Inc.'s CP/M and CP/M 86 operating systems, as well as IBM's DOS for its Personal Computer. The package logically displays file information, including the user's own 42-char. file description. The package costs $100 and requires 32K bytes of disk space, the vendor said from Suite 250, 2532 Durant Ave., Berkeley, Calif. 94704.

Microtech Exports, Inc. has announced **Reformatter**, a package that converts files developed on 16-bit microcomputers under Digital Research, Inc.'s CP/M 86 operating system to a format compatible with IBM's 3741 data stations. The package costs $350, the vendor said from Suite 2, 467 Hamilton Ave., Palo Alto, Calif. 94301.

Science Management Corp. has announced that its **SMC Basic** programming language is available for 16-bit microcomputers developed by NCR Corp., Computer Consoles, Inc., Computhink, Inc., CIE Systems, Inc., Alcyon Corp. and the Dual and Codata Divisions of Unisoft Corp. SMC Basic costs $395, Science Management said from 1011 Rt. 22, P.O. Box 6800, Bridgewater, N.J. 08807.

Mirror Images Software, Inc. has introduced **Mirrorgraph**, a menu-driven graphics package designed for the IBM Personal Computer running under IBM DOS 1.1. The package reportedly enables the user to construct bar graphs, pie charts and multiple-line graphs from raw data. Mirrorgraph retails for $59.95, the vendor said from 1223 Peoples Ave., Troy, N.Y. 12180.

Stoneware, Inc. has unveiled **DB Master Version Four**, its data base management program, for Apple Computer, Inc. Apple II+ and Apple IIe computers. Version Four reportedly includes an additional 16K bytes of memory, a field editor, improved screen prompting and reusable sort diskettes. DB Master Version Four retails for $350. More information is available from Stoneware, 50 Belvedere St., San Rafael, Calif. 94901.

Desktop Computer Software, Inc. has announced an Apple Computer, Inc. Apple III version of its **Graph 'N' Calc**, a menu-driven graphics and statistical analysis program. The new version, said to support the Apple III Profile hard disk, allows users to store and display charts and prepare a variety of stacked and side-by-side bar charts, line charts, pie charts and combined line and bar charts. The package costs $249 from the vendor at 303 Potrero St., 29/303, Santa Cruz, Calif. 95060.

Software Publishing Corp. has announced that its **PFS:File, PFS:Report** and **PFS:Graph** information management software packages for Apple Computer, Inc. computers are now available for the IBM and equivalent personal computers. PFS:File reportedly sorts and searches forms up to 32 pages long; PFS:Report is said to sort, calculate, format and print reports from information in files created with PFS:File; and PFS:Graph produces pie, line or pie charts. PFS:File and PFS:Graph cost $140; PFS:Report costs $125 from the vendor at 1901 Landings Drive, Mountain View, Calif. 94043.

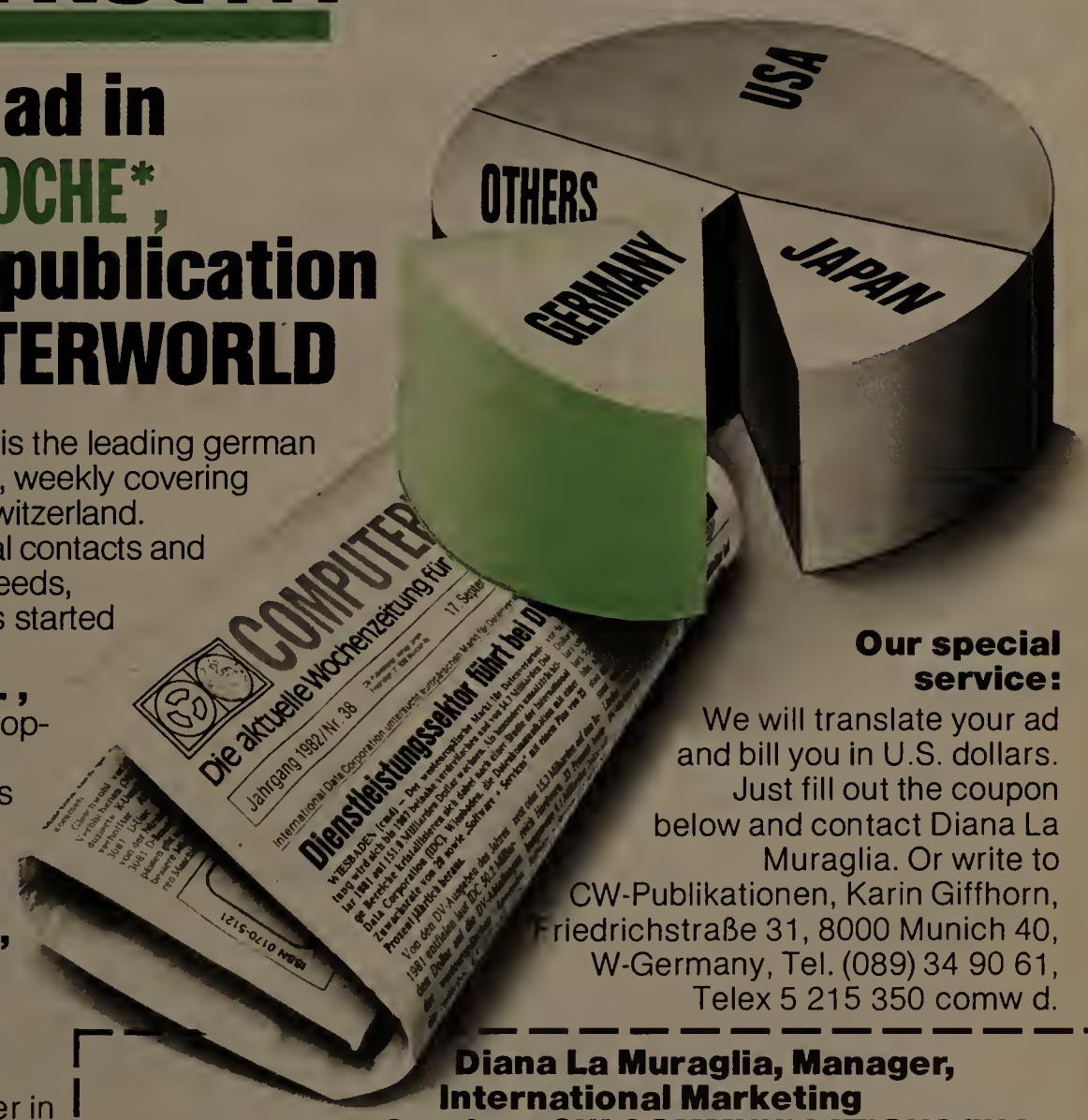
XYZZY has announced a data communications package for microcomputers and small business systems called **Gram-A-Syst.** The package reportedly allows microcomputers and Digital Research, Inc. CP/M-based equipment to utilize the Western Union, Inc. Easylink interface to the telex network. The package is said to allow users to send, receive, manage domestic and international communications and send telegrams and mailgrams. The price of the package is $250 from the vendor at Box 90002-116, Boulder, Colo. 80301.

Micropro International Corp. has announced an electronic spreadsheet and financial planning software package called **Calcstar 1.4**, which runs on the IBM Personal Computer and can be used with Microsoft, Inc.'s Wordstar. The package costs $145 from the vendor at 33 San Pablo Ave., San Rafael, Calif. 94903.

Jupiter Island Corp. has unveiled modifications and enhancements to its **Colortext** software package for multicolor printing. The program now features book-style justified type, additional spacing, margin-setting features and the ability to print in 22 colors. The package is priced at $149 from the vendor at Suite 1135, 1900 Powell St., Emeryville, Calif. 94608.

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Preview Issue: May 9th

Everything you need to know about the show before it happens. Our comprehensive NCC Preview Issue is all you need to guide you through the computer industry's largest trade exhibition.

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Color ad deadline for the NCC Preview Issue is April 22. Black & White is April 29.

Show Issue: May 16th

This issue will have late-breaking show information, speech previews and final show details.

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Color ad deadline for the NCC Show Issue is April 29. Black & White is May 5.

Wrap-Up Issue: May 23rd

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Color ad deadline for the NCC Wrap-Up Issue is May 6. Black & White is May 13.

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CBS, NBC Endorse Its Future

FCC Authorizes Teletext Broadcasting

By Bruce Hoard
CW Staff

WASHINGTON, D.C. — The Federal Communications Commission (FCC) has authorized the broadcasting of teletext and a joint study conducted by CBS and NBC has endorsed its future.

Teletext is a generic term for systems that transmit words and graphics to home televisions equipped with special decoding devices. Unlike videotex systems, which receive and transmit information over telephone lines, teletext systems are only able to receive.

The FCC decided to allow both commercial and noncommercial stations to offer teletext.

Although multiple teletext systems exist, the FCC chose not to endorse a single one, deciding instead to let the various schemes compete with each other.

The joint CBS/NBC study was conducted in approximately 75 Los Angeles homes between April and July 1982. Each of the 75 homes received a television set equipped with a prototype teletext decoding device and a specially designed meter to record usage of individual pages of teletext. Viewers filled out diaries and participated in focus groups to report usage.

As a result of the study, both networks have announced the inclusion of teletext with their regular programming. CBS was slated to start its service — known as Extravision — on April 4. NBC said that it will distribute a commercial teletext service this summer.

Albert H. Crane III, vice-president of Extravision, said that a major advantage of teletext is its ability to put users in control by providing information at the push of a button. He reported that the experiment was met with enthusiasm by viewers.

"A number of people said they suffered 'withdrawal' when their keypads were taken away at the end of the test," he said. "Also, we were impressed with people's demand for constantly changing information, even advertising information. Viewers said they wanted sales and specials information updated as often as possible."

Barbara Watson, general manager of NBC Teletext, said about 30% of all pages of NBC's test teletext service accessed by viewers were news pages.

Other findings of the study included:

- Viewers found it was easy and convenient to use teletext.
- A substantial portion of viewing was "stand-alone" and did not come out of watching regular commercial television.
- Viewers liked comparative pricing of such things as grocery items and airline fares with information constantly updated.
- The test confirmed the need for high-resolution graphics in both information and advertising.

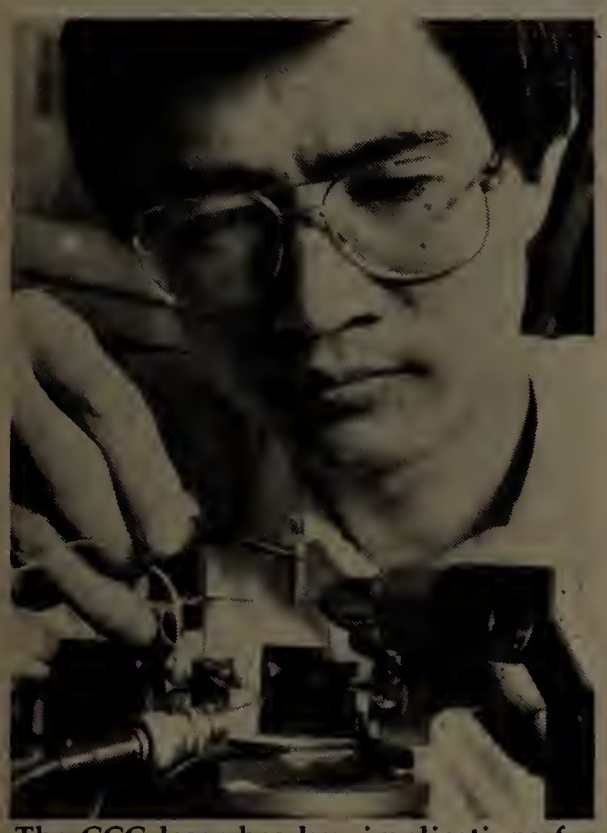
The Los Angeles test used production and decoding equipment provided by the French government and based on the experimental Antiope teletext transmission standard, which produces an alpha-mosaic display on the television screen.

NBC announced its national service will use the North American Broadcast Teletext Specification (Nabts) teletext system. CBS will also use the Nabts teletext system.

Laser Communications System Developed by Bell Researchers

By Jim Bartimo
CW Staff

NEW YORK — Bell Laboratories announced last week that it has developed a laser communications system. Through the use of an ultrapure single frequency, the system is said to allow light-wave systems to carry large amounts of voice, data and graphics.



The CCC laser has key implications for light-wave communications.

The semiconductor device is still in the testing phase, and Bell Labs predicted that the earliest application would come no sooner than 1984.

The cleaved coupled-cavity (CCC) sys-

(Continued on Page 72)

Ztel System Combines Features Of Local-Area Net, Voice PBX

By Bob Johnson
CW New York Bureau

NEW YORK — A communications system said to combine the voice features of a private branch exchange (PBX) and the data transmission capabilities of a local-area network has been introduced by Ztel, Inc.

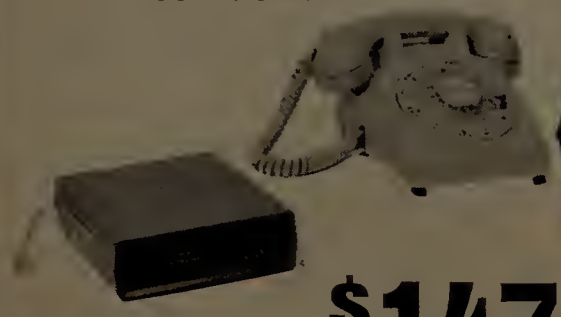
At the same time, the firm also unveiled three digital telephones that are designed to be used with the new system.

Called the Private Network Exchange (PNX), the system features a combination of PBX and local-area network technology that is implemented through custom large-scale integration (LSI) circuits, software and new types of fault-tolerant distributed system architecture. The system is designed to lower the overall cost of both voice and data communications, a Ztel spokesman said.

(Continued on Page 74)

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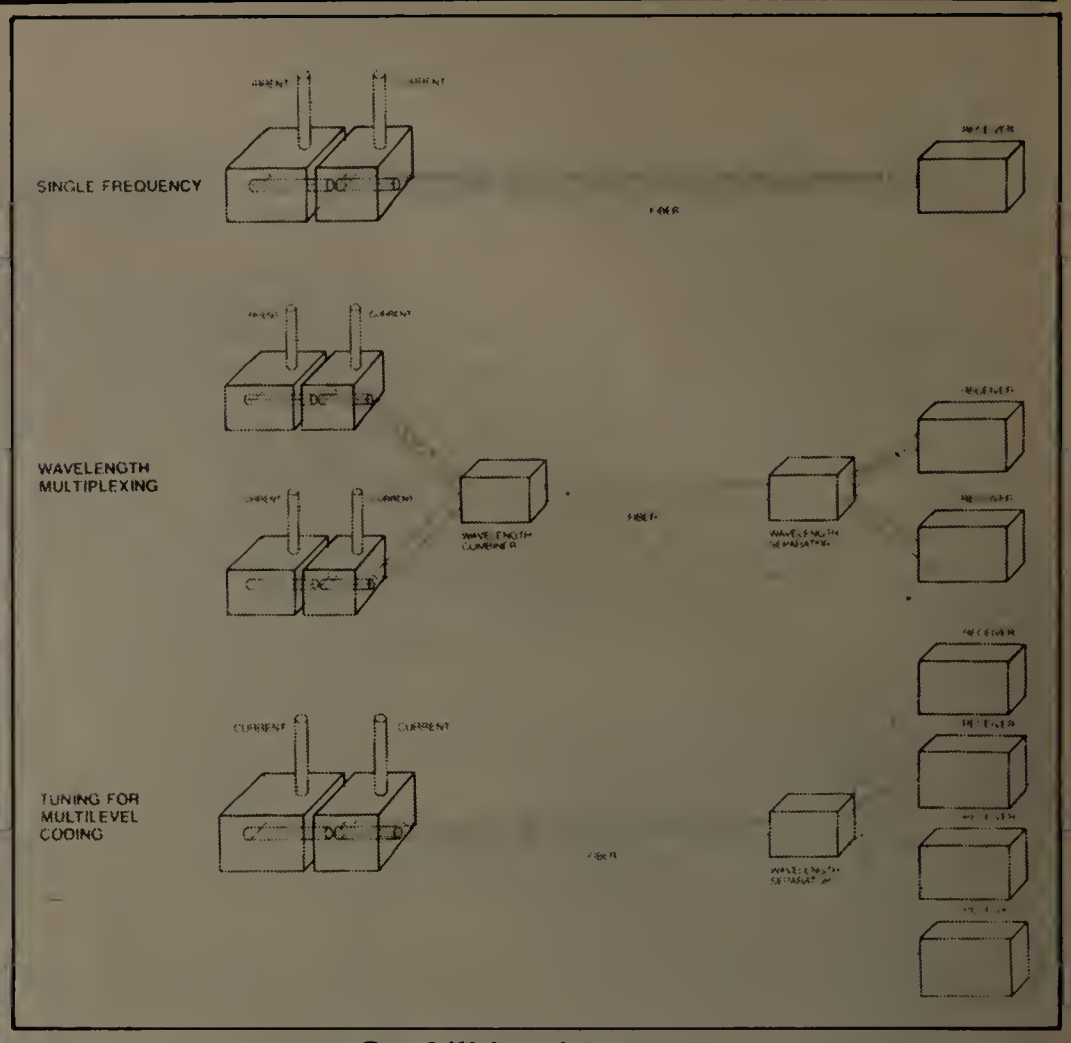
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Capabilities of C³ Laser

Bell Researchers Develop Communications System

(Continued from Page 71)

tem filters a laser beam through two separate but closely aligned semiconductors. The CCC semiconductor laser is said to be pure enough after filtering to send more than a billion bits per second through a glass fiber without error. It is also said to allow multiplexing of optic signals.

The benefits of CCC were outlined at a press conference last week by Arno Penzias, vice-president of research at Bell Labs. "In a nutshell," he said, "a CCC laser can:

- "Be electronically tuned. This should let us use this general-purpose laser in light-wave communications systems operating at different frequencies or use a single laser to send different frequency signals over the same fiber.
- "Produce ultrapure, single-frequency light pulses, increasing the distance the signals can travel before expensive repeaters are needed.
- "Be turned on and off, producing a billion pulses of light per second and still operate as a single-frequency laser, promising much higher capacity communications systems."

When tested last February, the CCC set a world-distance transmission record by emitting pure light at 1.55 microns and sending information at a rate of 420M bit/sec through 75 miles of glass fiber without the use of a repeater to boost the signal. An error rate of one per billion bits was recorded.

"Now at our transmission rate of 420M bit/sec, we could send the entire text of a 30-volume encyclopedia within one second," said Won-Tien Tsang, developer of the system. "The quality of transmission would be such that the text would be received without fault, except that one letter in the text might be capitalized instead of lowercase."

The low error rate and ultrapure signal is said to be accomplished through the dual semiconductor filtering system that eliminates the unneeded frequencies that commonly smear current laser signals. "I don't mean to criticize conventional lasers," Tsang said, "but an ultrapure signal can handle more data more efficiently."

As a practical example of how this technology might be used, Penzias said, "We have the potential of transmitting as many as several thousand Picturephone Meeting Service channels over a single pair of glass fibers." While Penzias called CCC "the nearest thing to an optical transistor," Bell Labs is uncertain if the technology will ever even come to market. If it does, "we're talking about years, not months," he said.

'Smartcom II' Fits IBM Micro

NORCROSS, Ga. — Hayes Microcomputer Products, Inc. has announced communications software for the IBM Personal Computer using a Hayes Smartmodem Model 300 or 1200.

Smartcom II is supported by the autodial/autoanswer Smartmodems and automatically logs a user onto a remote system, such as a time-sharing service, information utility, data base or microcomputer, a vendor spokesman said.

The program supports up to 16 disk drives, both parallel and serial printers and a display. The program requires an 80-col. monitor, one disk drive, 96K bytes of random-access memory, an asynchronous communications card and IBM DOS 1.00 or 1.10.

Smartcom II costs $119 and is available through retail stores.

The vendor is located at 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.

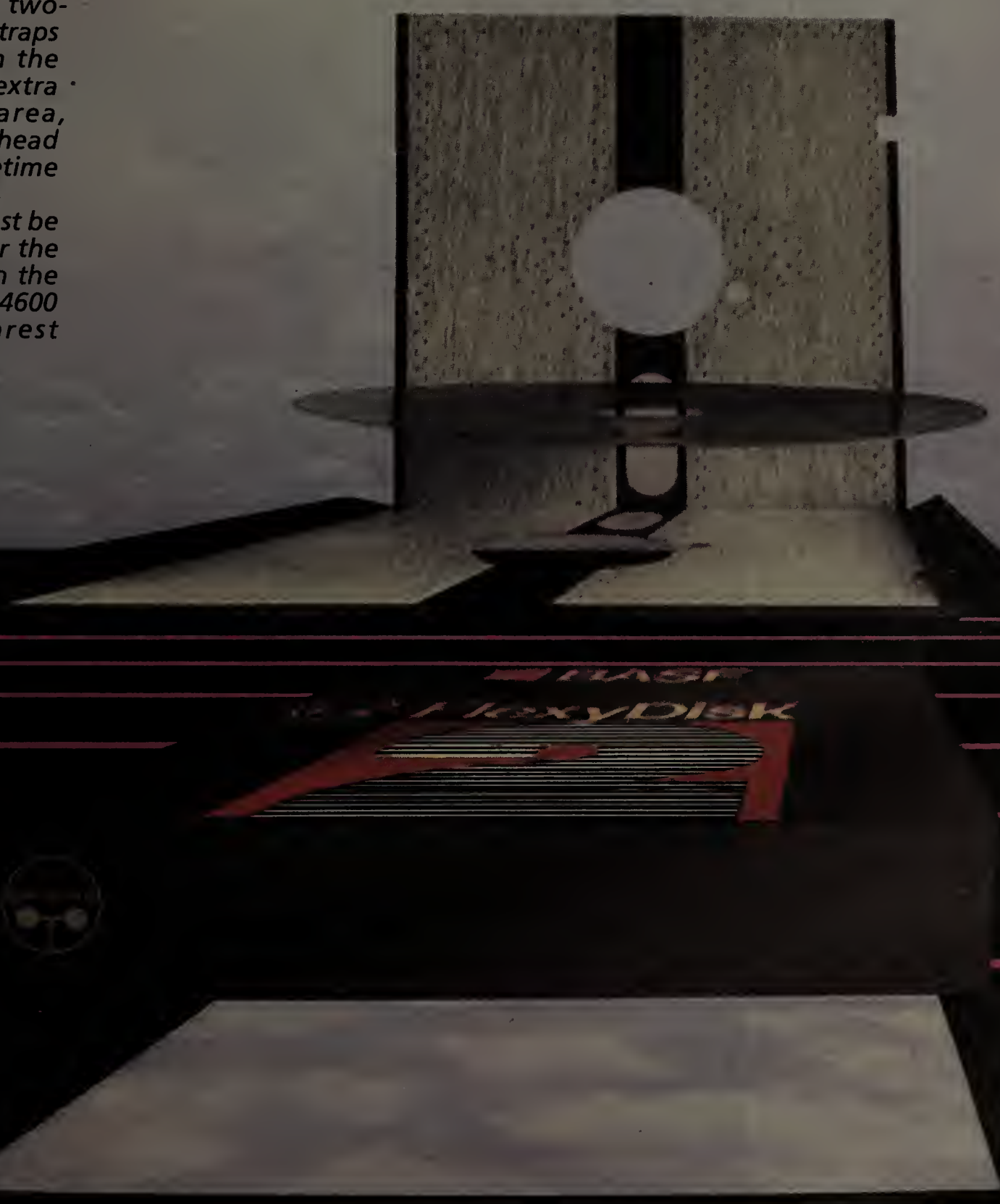
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Tymnet Desktop Version Offers Full Compatibility

SAN JOSE, Calif. — Tymnet, Inc. has announced a desktop version of the company's Tymnet Engine communications processor for network systems.

The Tymnet Micro-Engine is said to be fully compatible with the Tymnet family of communications processors and reportedly performs the same basic functions, but with fewer configuration options. Asynchronous transmission speeds from either 50 to 1,200 bit/sec, or 300 to 4,800 bit/sec are supported, and synchronous I/O can be supported at speeds up to 19,200 bit/sec.

The Micro-1, with 256K bytes of memory is a stand-alone concentrator for asynchronous terminal interfaces and handles up to 16 asynchronous terminal ports and four synchronous network lines. The Micro-2, with 512K bytes of memory, reportedly supports up to 16 asynchronous and eight synchronous terminal ports simultaneously.

The Micro-1 costs $10,000; the Micro-2 is $15,000, from 2710 Orchard Pkwy., San Jose, Calif. 95134.

Plexus Implements NOS

SANTA CLARA, Calif. — Plexus Computers, Inc. has made three announcements said to bring networking and mainframe communications capabilities to its family of Bell Laboratories Unix-based supermicrocomputers.

Plexus announced that it has implemented a Unix-based NOS employing Xerox Corp.'s Ethernet hardware. NOS is said to allow communications over a local-area network, as well as enable users to erect a network of individual systems. Available in July, NOS will cost $1,500 per Plexus system. Ethernet hardware costs $3,450.

Plexus also announced a Virtual Protocol Machine (VPM) facility implementation under Unix. A data communications subsystem of the Unix System III operating system, VPM reportedly enables users to link Plexus 16/32-bit and 16-bit supermicrocomputers to IBM and other mainframe systems. VPM, available now, is included in the Plexus implementation of Unix System III, which costs $2,000.

The third announcement is that remote job entry (RJE) applications are now supported under Plexus' implementation of VPM. RJE uses the Hasp multileaving workstation protocol. Jobs submitted to a mainframe for processing under RJE return to the Plexus system, where they reportedly can be printed, stored, edited or further processed by Unix-based software. RJE costs $750 from the firm at 2230 Martin Ave., Santa Clara, Calif. 95050.

Ztel Combines Local Net, PBX

(Continued from Page 71)

William P. Karavatos, vice-president of maketing for the company, noted, "There are a number of advantages in combining the two technologies. PBX wiring is already in place in most businesses, and the PBX voice functionality will always be required. The local-area network technology facilitates the linking of intelligent workstations to other office devices."

PNX moves data through a baseband token ring local-area network architecture as defined by IEEE 802.5 standards.

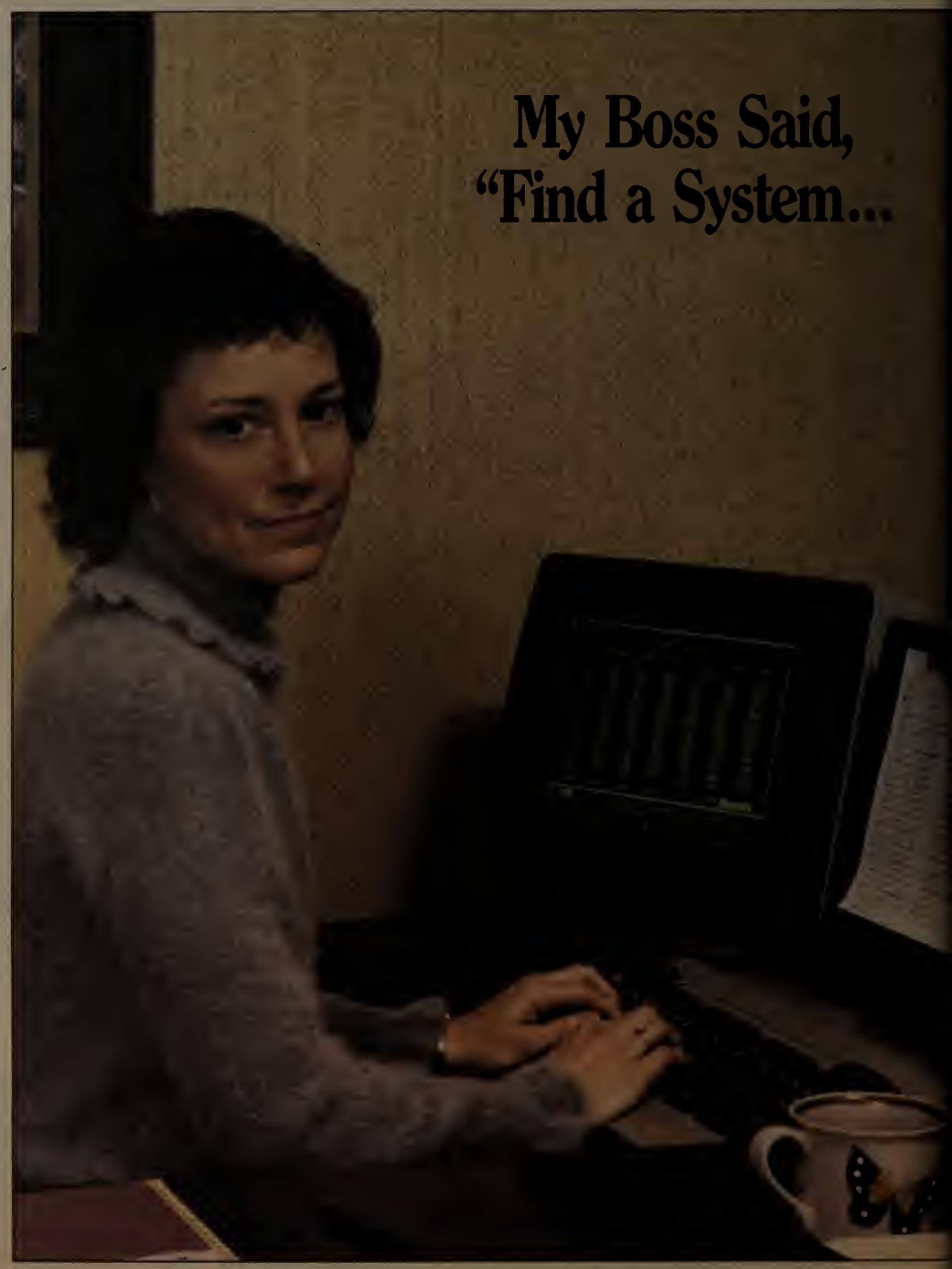
Each ring in the network is operated at the standard rate of 10M bit/sec. The company spokesman explained that in the token ring network, the transmission medium forms a circle through each connected device. Information is communicated in sequential order around the ring, and devices transmit and receive data by appending or extracting messages from the medium as tokens circulate through the network.

Data and analog information is digitized and packetized upon entering the PNX network and then intermixed with packets from other transmissions for routing, Ztel noted. Any data device with an IEEE 802 token-passing ring local-area network interface can reportedly be directly attached to the PNX. The ring transmission media may be either coaxial cable or fiber optics, the company added.

A ring processor interfaces the PNX with up to 512 information devices, which can include telephones, terminals, personal computers, facsimile equipment, industrial processes and compressed video. The system's application processor provides features such as system management, voice/data call processing, on-line directory, electronic mail, least cost routing, station message detail recording, protocol conversion and X.25 PAD, Ztel said.

Three digital telephones designed for use with the PNX were also introduced. They include a management-level "telset" with 40-character display and 28 feature keys; a telset with 12 feature keys; and a digital single-line instrument.

Pricing for a typical PNX configuration, including digital telephone and local-area network, starts at $800 per line. First shipments are scheduled for March 1984. More information is available from Ztel, Andover Industrial Center, York St., Andover, Mass. 01850.



PBX Interfaces With Analog or Digital Systems

By Robert Batt
CW West Coast Bureau

DUARTE, Calif. — A private branch exchange (PBX) system designed to interface with step-by-step analog or digital PBX systems of between 40 and 400 lines has been introduced by the Alston Division of Conrac Corp.

Called the Future Office Exchange (FOX), the system, which contains a universal digital controller, is said to enable PBX users to upgrade their present systems to include voice, data and office automation capabilities.

Initially, the vendor plans to introduce optional communications modules including: call accounting, which records and processes event data on each outgoing call; least cost routing, which was designed to evaluate all outgoing calls and select the most economical route available; electronic mail; word processing; a financial work sheet for budgeting, forecasting and financial modeling applications; and data network access providing emulation and access to networks and equipment external to the system, such as the X.25 protocol and local-area networks.

Robert Griffith, director of marketing, claimed a major advantage of the new FOX system is that it enables users to use existing equipment and thereby not lose their initial PBX investment.

The FOX system, available in the third quarter of 1983, will cost $50,000, the vendor said.

Joint Venture Started

In a related development, Conrac also announced it has set up a joint venture with Applied Computing Devices, Inc. to manufacture a universally adaptable, local-measured rate exchange billing system and network for direct sale to telephone companies.

According to the two companies, the system, to be called the Local Office Billing Operation System (Lobos), will allow users to monitor front-end event detection and generation of single-entry call records.

Call records are said to be stored at switch sites until scheduled polling routes are initiated, the vendor spokesman said.

Delivery of Lobos is scheduled for the first quarter of 1984 and will cost approximately $15 per line for medium to large systems.

Conrac's Alston Division is located at 1724 S. Mountain Ave., Duarte, Calif. 91010.

Gateway-488 To Include IEEE Interfaces

AUSTIN, Texas — National Instruments, Inc. has expanded its Gateway-488 line of systems to include IEEE-488 interfaces.

The Gpib-796 interface module reportedly makes it possible to transfer data between the multibus and the IEEE-488 bus.

The design of the Gpib-796 interface is said to provide IEEE-488 access to high-end multibus systems based on 32-bit microprocessors, while maintaining a product compatible with 16- and 8-bit microprocessors. The interface can be used as an IEEE-488 talker, listener or controller and conforms to the proposed IEEE-796 bus specification, a vendor spokesman said.

The Gpib features direct memory access, multibus addressing capability, I/O port addressing, carry cycle function, and direct memory access test mode.

The Gpib-796 is priced at $1,295. More information is available from National Instruments, Inc., 12109 Technology Blvd., Austin, Texas 78759.

Preston Scientific Offers Convertor

ANAHEIM, Calif. — A multichannel analog-to-digital convertor designed to handle wideband analog signals in data acquisition systems has been announced by Preston Scientific, Inc.

The rack-mounted Model Gmad1A-15B analog-to-digital convertor is available for both single-channel and multichannel applications that require a full complement of digital I/O interface signals.

Equipped with a sample-and-hold amplifier said to provide an aperture time of 1 nsec, the unit can have as many as eight simultaneous sample-and-hold channels in a single chassis, or up to 128 sample-and-hold channels in multiple-chassis systems.

Prices typically range from $11,000 to $15,000. More information is available from Preston at 805 E. Cerritos Ave., Anaheim, Calif. 92805.



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Network Processor Based On Motorola 68000

OREM, Utah — Novell, Inc. has introduced a Motorola, Inc. 68000 microprocessor-based network processor.

The basic unit includes one multiplexer board for control of up to six workstations, 128K bytes of memory and one RS-232C serial port for a shared printer. The processor can be enhanced to include a 512K-byte memory expander board, up to three more multiplexer boards to handle up to 24 workstations and a four-port serial board for additional printers.

The unit with 256K bytes of memory, six-port multiplexer, two RS-232C ports, power supply and multitasking operating system software costs $7,995 from the vendor at 1170 N. Industrial Park Drive, Orem, Utah 84057.

Security Device Also Announced

Alpha Micro CRT Terminal Bows

IRVINE, Calif. — Alpha Micro has announced a video display terminal said to be compatible with any Alpha Micro system.

The AM-60 video display terminal features a tilting/rotating screen display, detachable keyboard, horizontal/vertical split-screen capability, line-drawing character set, programmable function keys and programmable status lines, according to a vendor spokesman.

The company also announced a software security device (SSD). The SSD is an integrated circuit that regulates which software programs are allowed to run on a particular system, a vendor spokesman said. The price of the terminal ranges from $600 to $900 and the SSD program is included with all products sold by the vendor. More information is available from the vendor at 17332 Von Karman, Box 18347, Irvine, Calif. 92714.

Update Of Modem Introduced

SEATTLE — Communications Research Corp., a subsidiary of Energy Sciences Corp., has released a multichannel line-carrier modem for data transmission over ac power lines.

The LCM400, an expanded version of the LCM100, reportedly has the capability of networking up to four peripherals at 9,600 bit/sec over ac power lines in a building. The modem was designed to give users the ability to transmit data over greater distances with more power and receiver sensitivity, a vendor spokesman said.

The modem lists at $497 and is available from the vendor at 1720 130th Ave. N.E., Bellevue, Wash. 98005.

IEEE Module Unveiled

BROOKFIELD, Conn. — Connecticut Microcomputer, Inc. has introduced a 64 digital line input module said to be a self-contained IEEE bus-compatible device.

The Busster A64 Digital Input Module accepts commands from any host computer through its IEEE port, reads and stores data from a digital line and then sends this information back to the computer. The module is programmed with Basic commands from the controlling computers, a vendor spokesman said.

The module sells for $495 including case and power supply. More information is available from the vendor at 36 Del Mar Drive, Brookfield, Conn. 06804.



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The CMX Cable Multiplexer system is available in 32-port, 24-port, 16-port and 8-port models. It is completely transparent to IBM user software and terminal operation and meets all type A interface and cabling specifications.

Please call the regional office nearest you for more information about the CMX system: Santa Clara, CA, (408) 496-6464; Burlington, MA, (617) 273-5858; St. Louis, MO, (314) 434-1024; Dallas, TX, (214) 385-7090; Los Angeles, CA, (714) 553-1771; Edison, NJ, (201) 225-5225; McLean, VA, (703) 448-1117.

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Plus Attachments for IBM Micro

ITT Courier Enhances C-270 CRT Unit Family

TEMPE, Ariz. — ITT Courier Terminal Systems, Inc. has introduced a product addition to its C-270 CRT terminal family, two color terminals and two display attachments for the IBM Personal Computer.

Additions to the C-270 information display system family are the 1700-21 and the 1700-22 terminals. These products are said to be functionally compatible with IBM 3278 Model C-1 and C-2 and provide the base function of an IBM 3278 Model 2 Display System.

The 1700 terminal series features a 12-in., 1,920-char. display and a detachable keyboard. The list price for the series begins at $1,550.

Also announced were the 2,560- and 3,440-char. color terminals, Models 2790-3A and 2790-4A. These terminals offer seven colors and retain the functions of the vendor's 1,920-char. color terminals. The 2790-3A is available for $3,200 and the 2790-4A for $3,350.

The personal computer controller attachment allows an IBM Personal Computer and other models prequalified by ITT, to connect to ITT's 741X and 7601 controllers. The attachment also allows the customer to communicate with a host computer and reduce or eliminate modem terminator and line costs, a vendor spokesman said. Available in August, the attachment will cost $825, according to a vendor spokesman.

Personal computer attachment Model 1199 connects the IBM Personal Computer logic element to an ITT 2700-13 monochrome or 2790-2A color terminal. This reportedly expands the use of the available applications at the ITT display terminal or, when alternately connected, allows operation in asynchronous serial communications mode. The Model 1199 is available for $600.

More information is available from ITT Courier Terminal Systems, 1515 W. 14th St., Tempe, Ariz. 85281.

MDRM Ups Memory On CP9000

GERMANTOWN, Md. — M/A-Com DCC, Inc. has announced a multiple-density, random-access memory module (MDRM) for the firm's CP9000 communications processor.

The MDRM can increase memory on CP9000 processors to 4M or 8M bytes for expanded statistics gathering or message buffering. In addition, the MDRM offers double- and single-bit error correction, the vendor said.

A 128K-byte MDRM costs $5,800, and a top-of-the-line 1M-byte version costs $9,500, the vendor said from 11717 Exploration Lane, Germantown, Md. 20874.

IBM Micro Tied to DEC

NASHUA, N.H. — Screenware Corp. has introduced a software package said to provide terminal compatibility between IBM Personal Computers and Digital Equipment Corp. minicomputers.

The PC-Link allows the use of an IBM Personal Computer with any DEC minicomputer by emulating DEC private and Ansi X.3.64 standards. It accesses a range of DEC software including editors, electronic mail, form management systems and system monitoring facilities, a vendor spokesman claimed.

The package is available for $40 from Screenware Corp., P.O. Box 3662, Nashua, N.H. 03061.



Polling Package Posse Unveils

DALLAS — A Rolling Package for retailers using Sweda International, Inc. L-50 Data Collectors, an IBM System/34 and Binary Synchronous Communications has been announced by Posse, Inc.

The package is said to poll the data collectors (Model 8456 cassette and 8452 diskette) at 2,400 bit/sec, convert the data from Ascii to Ebcdic code and perform basic editing.

The data can then be used by Posse's sales and inventory packages or by the retailer's own system. The package costs $2,000. For retailers who prefer to hand-carry the L-50 diskette to a computer, the Ascii-to-Ebcdic conversion and editing portions of the package are available for $1,200.

The firm is located at Suite 2161, 2828 Forest Lane, Dallas, Texas 75234.

Statistical Converters Can Work via Satellite

CHAMPAIGN, Ill. — Compre Comm, Inc. has announced two four-port statistical converters that will operate over either a terrestrial or a satellite link.

Q-Link Model 4AA24 will operate in asynchronous networks from 300 to 9,600 bit/sec and the Model 4AS192 in synchronous networks up to 9,600 bit/sec. Each will allow up to four terminals to interact with a remote computer over a single dial-up dedicated link.

The cost for each model is $1,195. More information is available from Compre Comm, Inc., 3200 N.Farber Drive, P.O. Box 3570, Champaign, Ill 61821.

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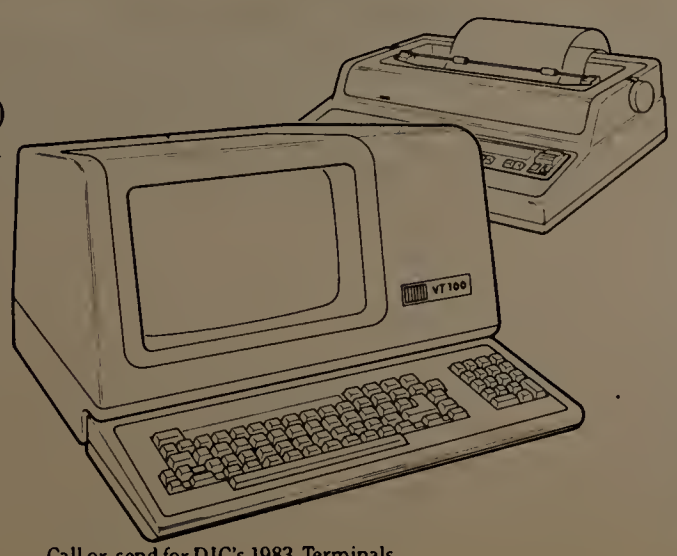
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CW 4/25

Digilog Unveils Switch for RS-232C Circuits

MONTGOMERYVILLE, Pa. — A network access switch (NAS) that provides switching functions for RS-232C and four-wire analog circuits, as well as alarm and interactive testing capabilities, has been unveiled by Digilog, Inc.'s Network Control Division.

The NAS allows users to isolate computer communications problems and switch in spare modems, lines and ports. It can operate as part of Digilog's Network Analysis and Management System or as a stand-alone unit and provides matrix switching, monitoring and interactive testing from central-site or remote locations.

The microprocessor-based NAS has an on-board controller that provides control functions for digital and analog subsystems, which supply the diagnostic access and switching functions for fault determination and backup or resource switching.

The unit also includes a CRT console and is fully redundant. Master controller, subsystem controllers and power supply are all backed up in the event of a failure.

The system supports up to 16 interface signals and is packaged in a cabinet capable of housing a fully redundant switching complex with a maximum of three nests.

Prices begin at $13,985 with additional information available from the firm at 1370 Welsh Road, Montgomeryville, Pa. 18936.

Colorgraphic Unveils Models of MVI-100s

ATLANTA — Colorgraphic Communications Corp. has introduced two models of its MVI-100 line of terminals. Each unit has dot-addressable 640 by 480 pixel graphics resolution on a 60 Hz noninterlace display.

The Model 480 and 489 both feature zoom, pan and graphics primitives as standard features. The 480 has a 13 in. in-line preconverged tube and the 489 has a 19 in. in-line preconverged tube.

The 480 lists for $5,000 and the 489 for $5,500 from Colorgraphic Communications Corp., 2379 John Glenn Drive, P.O. Box 80448, Atlanta, Ga. 30366.

Buffer Out For HP User

OAKLAND, Calif. — A Zilog, Inc. Z80-based productivity tool for Hewlett-Packard Co. HP 3000 users has been introduced by the Type Ahead Engine Co.

Designed for frequent users of terminals, such as programmers, data entry personnel and word processor operators, the Type Ahead Engine (TAE) is said to provide buffering, programmable softkeys and other features unavailable in the HP 3000.

The TAE is installed between the terminal and the computer without alterations in the operating system or existing terminals. TAE is said to eliminate the lag waiting for the next prompt.

Prices start at $500 per terminal from 534 Rosal Ave., Oakland, Calif. 94610.



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Add-On Modules Push 64K-Bit Chips For VAX-11/780

MAYNARD, Mass. — Digital Equipment Corp. has released add-on memory modules containing high-density, 64K-bit chips for its VAX-11/780 computers.

The memory subsystem is said to increase the VAX's maximum main memory to 32M bytes. In addition, the 64K-bit memory has standard interleaving.

The 64K-bit subsystem consists of a recently devised memory controller and memory array boards with four times the capacity of the older 16K-bit memory modules, DEC said. These devices reportedly plug into the memory backplane that attaches to the VAX-11/780 SBI.

The new memory will be sold in 2M-byte increments. With controller, prices are $36,000 for 4M bytes and $28,000 for 2M bytes. Add-on memory modules are priced at $9,000 for 2M bytes, $17,000 for 4M bytes, $24,000 for 6M bytes, and $34,000 for 10M bytes.

In a concurrent announcement, the company unveiled lower prices on 64K-bit random-access memory options for its VAX-11/750 and VAX-11/730 systems and for small PDP-11 and LSI-11 computers that use the LSI-11 bus. Reductions range up to 46% for VAX add-on memory and 39% for PDP-11 memory options.

Further details are available from DEC in Maynard, Mass. 01754.

Solvation's Adbiz Suits Ad Agencies As Turnkey System

WESTBORO, Mass. — Solvation, Inc. has announced Adbiz, a turnkey computer system for small- to medium-size advertising agencies.

Based around Vector Graphics, Inc.'s 8-bit microcomputer, the Abdiz holds up to 128K bytes of random-access memory and either 5.2M- or 14M bytes of disk storage. The system includes specialized advertising software and a printer. Features include reports on individual client profitability, individual employee productivity, cash requirements and work in process.

The system is available in two configurations: a system with 5.2M bytes of disk storage costs $20,000. A system with 14M bytes of disk storage costs $25,000, the vendor said from 150 Flanders Road, Westboro, Mass. 01581.

Exec Sees Nastec MCT2000 As Development Advance

LOS ANGELES — "Considering this new automated tool a major advance in system development, I felt it could contribute significantly to system development productivity improvement within First Interstate Services Company," said John Riggs, the company's vice-president.

First Interstate Services Co. (Fisc) provides data processing and information systems services to affiliate banks in 11 western states, with roughly 322 programmer/analysts on board. Riggs made the above statement when referring to Nastec Corp.'s MTC20000 Analyst Workstation, after his company conducted an extensive pilot study on the product.

Two MTC2000 workstations were installed June 14, 1982, at Fisc's El Segundo, Calif., facility. Primary administrative personnel were trained June 16-18, 1982 by Nastec support analysts. Next, a group of 15 programmer/analysts at the facility were selected to participate in the pilot study, and a questionnaire was developed to collect information from this group, Riggs explained.

The purpose of the questionnaire, according to Riggs, was to determine what percent of time would be spent on the new system vs. manual methods and to identify all benefits, training requirements and other characteristics of the product.

The results of Riggs' study indicated that the MTC2000 Analyst Workstation

(Continued on Page 84)

For H 300 System and Up

Harris Offers Shared Disk

FORT LAUDERDALE, Fla. — Harris Corp. has announced a shared disk subsystem for its H 300 and larger systems.

Using the firm's recently announced Integrated Disk Controller, the subsystem operates with those Harris systems running under the vendor's VOS operating system and that have a shared memory capability. The subsystem allows two CPUs to access common disk files, according to the firm. Disk drives can be shared or dedicated under one controller, the vendor said.

By using a specialized software program that costs $4,500, users can install virtually unlimited numbers of disks, a company spokesman claimed. Dual port disk drives with dual integrated disk controllers cost from $14,500 for an 80M-byte model to $41,950 for a 675M-byte version. Harris' Computer Systems Division is located at 2101 W. Cypress Creek Road, P.O. Box 6200, Fort Lauderdale, Fla. 33310.

Plessey Peripheral Designs Subsystem For DEC's LSI-11

IRVINE, Calif. — Plessey Peripheral Systems has announced a 20.8M byte 5¼-in. Winchester-based subsystem that can be used with Digital Equipment Corp.'s LSI-11 based systems.

The subsystems are additions to the Series/6000 line, which includes 10.4M- and 28M-byte subsystem units, and are available with floppy or tape removable media for I/O and archival storage, according to a vendor spokesman.

The subsystems range in price from $4,550 to $11,250 for the 20.8M byte-units, from $3,550 to $7,850 for the 10.4M-byte configurations and from $7,280 to $13,170 for the 28M-byte versions, the spokesman said. Additional information is available from the vendor at 17466 Daimler, Irvine, Calif. 92714.

OSM Multiprocessor Holds Z80A Module

MOUNTAIN VIEW, Calif. — OSM Computer Corp. has announced a multiprocessor, multiuser microcomputer containing a master Zilog, Inc. Z80A module that allows four users to share 64K bytes of internal memory and run programs compatible with Digital Research, Inc.'s CP/M operating system.

Including the master Z80A module, the basic version of the Zeus4 contains four Z80 CPUs, a 19M-byte Winchester disk module, a 5¼-in. floppy disk module, a switching power supply module and a system/user board module, according to a vendor spokesman.

The Zeus4 connects up to four dedicated computers to each other and the master controller through a high-speed, parallel, bidirectional, asynchronous interprocessor data channel that transfers data at 200K byte/sec. By picking up the system overhead load, the master processor frees up the user boards for computation and data processing.

The eight-bit system operates under the firm's Muse operating system and reportedly has all the CP/M operating system's features in addition to file management functions, password protection, print spooling, data security, autosearching and user polling. Muse uses approximately 24K bytes of random-access memory with the remaining 40K bytes providing a disk buffer pool that serves as a cache memory, improving the system's throughput rate, the spokesman explained.

A four-user, 64K-byte configuration of the system costs $6,575. The single-user model lists for $4,595.

Zeus4 is available for immediate delivery, the vendor said from 665 Clyde Ave., Mountain View, Calif. 94043.

Matrix Line Printer/Plotter Out

IRVINE, Calif. — Printronix, Inc. has announced a matrix line printer/plotter designed to produce engineering and scientific graphics printouts, bar code and scanning system labels, business forms and facsimile printing.



Printronix 4160

The Printronix 4160 increases the resolution of graphics printouts by reducing the diameter of the print hammer dot to .01-in., or one-half the size of the standard dot on other Printronix printers The speed of the 4160 is said to be 2,300 dot rows per minute at the maximum plot width of 13½ in. and is reportedly capable of producing an 8½- by 11-in. drawing in approximately 40 seconds.

The price of the 4160 is $5,380 from the vendor at 17500 Cartwright Road, Box 19559, Irvine, Calif. 92173.

Versatec Scanning System Out

SANTA CLARA, Calif. — A scanning/editing/plotting system that is said to digitize aperture card images, display locally stored images, support interactive computer-aided design drawing and editing functions and send image data to local or remote plotters has been unveiled here by Versatec, Inc.

The Impres 500 reportedly transmits to Versatec's 11, 22, 24 or 36-in. electrostatic plotter for production of updated, full-size drawings, the vendor said. The system's Acris aperture card scanner, capable of reading a card in 20 sec, reportedly produces enhanced pixel images that can be modified at the system console or sent directly to the selected plotter.

Without plotter, the Impres 500 sells for $63,000. Versatec is based at 2710 Walsh Ave., Santa Clara, Calif. 95051.

IBM 4300 Backup Facility Targets Small, Medium Users

NILES, Ohio — RMI Co has announced the availabil ity of an IBM 4300 backup fa cility specifically designec for users of small and medium-size computers.

Designated Hotsite, the facility is equipped with an IBM 4341 Group 2 computer, tapes, disks, CRT terminals and communications equipment, according to the vendor. The Niles, Ohio, site was designed to accommodate up to 100 users with expansion planned in the future, the vendor said.

Monthly charges for the backup site range from $1,000 to $3,000, depending on customer requirements, according to a spokesman for the vendor. Further details are available from RMI at 1000 Warren Ave., Niles, Ohio 44446.

Mass Storage Device For Micros Unveiled

SAN JOSE, Calif. — A mass storage device for microcomputers that features removable tape cartridges capable of holding as much as 200M bytes of data has been unveiled here by Corvus Systems, Inc.

The Bank, as the device is called, is roughly the same size and price as a micro-Winchester hard disk drive and is perceived by computers as just such a drive, according to the vendor. It comes in the form of a continuous loop of 100-track magnetic tape encased in a cartridge approximately ½ in. square by 1½ in. thick.

The Bank costs $2,195. Deliveries are slated for September. Corvus is based at 2029 O'Toole Ave., San Jose, Calif. 95131.

Syntest Announces Printer

MARLBORO, Mass. — Syntest Corp. has announced a matrix printer that is said to provide 40-col. printout on inexpensive thermal paper.

The SP-400 miniature printer features switch-selectable transmission rates from 50 to 9,600 bit/sec. Input is standard RS-232C or 20 mA loop, with a 40-char. buffer, the vendor said.

The price for the SP-400 is $365 each, $285 in quantity. More information is available from the vendor at 169 Millham St., Marlboro, Mass. 01752.

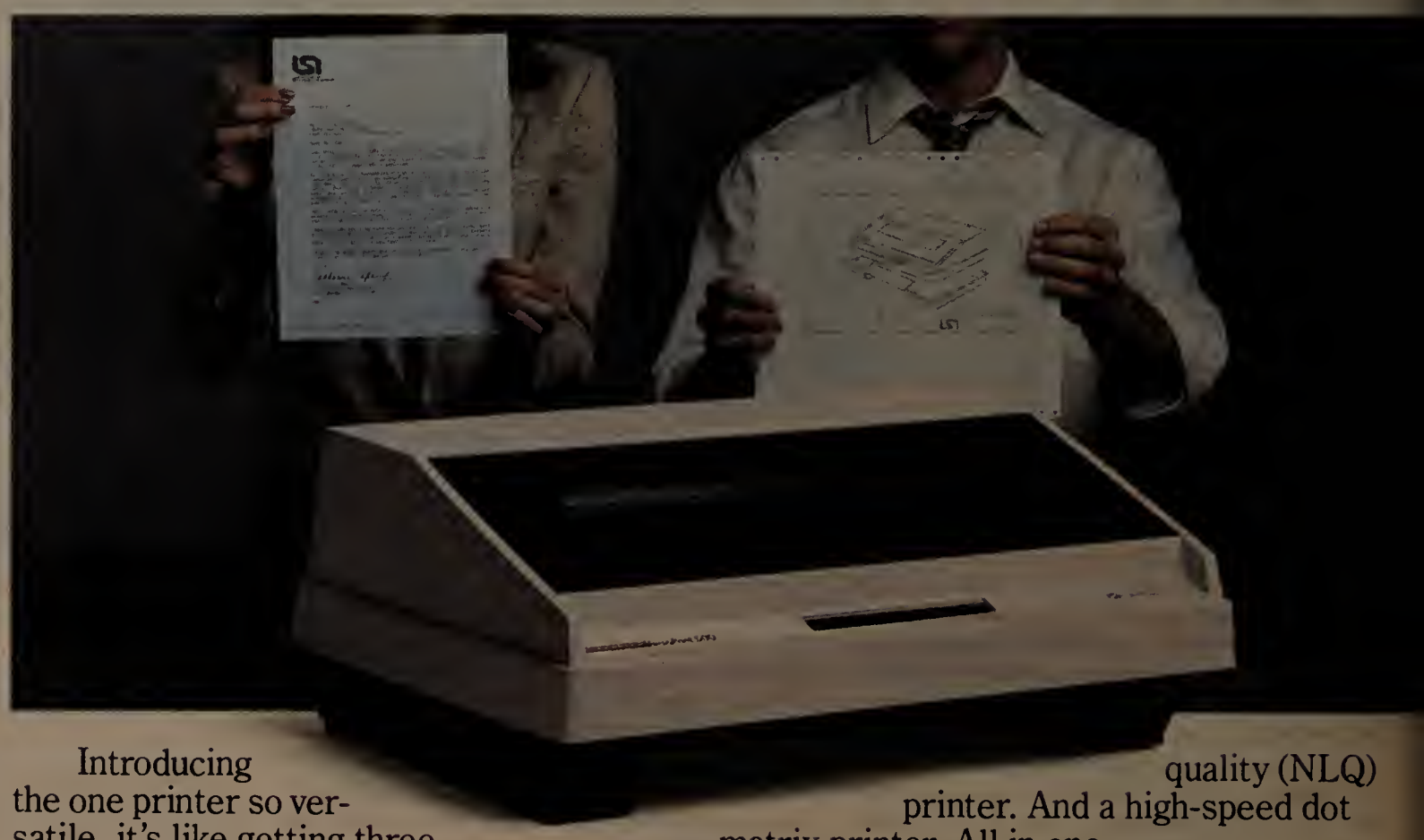
Serial Key Introduced

DEL MAR, Calif. — Staff Computer Technology Corp. has announced a serial version of its Key, a hardware module that is said to protect proprietary software products from unauthorized use.

The serial Key can reportedly be used with any computer system having an RS-232 interface. It is installed between the end of a standard RS-232 cable and the RS-232 connector of an existing RS-232 device.

The product is available for under $300 from Staff Computer Technology Corp., P.O. Drawer B, Del Mar, Calif. 92014.

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Lexidata Upgrades Graphics Subsystem, LX/GP1

BILLERICA, Mass. — Lexidata Corp. has announced an enhanced version of its Model 8100/GS distributed graphics subsystem with extended functionality of its locally embedded software pacakge, LX/GP1.

Functionally similar to the industry's proposed graphics standards, the Core System and the Graphics Kernel System, the enhanced version of the LX/GP1 contains segment/cell editing, picking and inquiry features.

The 8100/GS is available in a number of configurations, including 1280 by 1024 pixel color and monochrome systems, the vendor said. Prices start at $15,950. Further details may be obtained from Lexidata at 755 Middlesex Tnpk, Billerica, Mass. 01865.

Decision Mate V Gets Price Cut

DAYTON, Ohio — NCR Corp. has become the latest microcomputer maker to react to IBM's hard disk-based XT by reducing the price of its Winchester disk-based version of its Decision Mate V microcomputer 14% to 30%, as well as cutting the price of those of its products containing color CRT displays.

For example, the price of an eight-bit Decision Mate V, which comes with 64K bytes of random-access memory, a graphics processor with 32K bytes of dedicated memory, monochrome display, one integrated 320K-byte flexible disk drive, one 10M byte Winchester disk drive and Digital Research, Inc.'s CP/M 80 operating system, was reduced 25% from $6,500 to $4,850, the vendor said.

NCR's corporate headquarters are located in Dayton, Ohio 45479.

Panasonic Thermal Printer Designed for OEM Market

SECAUCUS, N.J. — The Electronic Components Division of Panasonic Industrial Co. has announced the EUY-3T, a thermal printer designed for the OEM market.

The unit features dot-addressable graphics capabilities on 80mm-wide paper, a single 5V dc power supply and a print speed of 1.2 line/sec. The unit can also print bidirectionally and has a minimum life of 500,000 lines, the vendor said

The units cost from $100, the vendor said from One Panasonic Way, Secaucus, N.J. 07094.

Zenith Cuts Z-100 Prices

GLENVIEW, Ill. — The Zenith Data Systems Division of Zenith Radio Corp. has announced price cuts of up to 12% on its Z-100 line of microcomputers.

For example, a Model ZF-100 with 5¼-in. floppy disk drive was reduced from $3,249 to $2,899. Likewise, the ZF-120 with two 5¼-in. floppy disks and a built-in green monochrome display was reduced from $4,099 to $3,599, the vendor said.

The vendor is located at 1000 Milwaukee Ave., Glenview, Ill. 60025.

Systemcard Out For IBM Micro

BELLEVUE, Wash. — Microsoft, Inc. has announced Systemcard, a four-function card for the IBM Personal Computer.

Systemcard features both serial and parallel interfaces plus up to 256K bytes of random-access memory and a calendar/clock with battery backup. Use of the card frees more expansion slots in the IBM Personal Computer, the vendor said.

A 64K-byte version of Systemcard costs $475, the 256K-byte version costs $995, the vendor said from 10700 Northup Way, Bellevue, Wash. 98004.



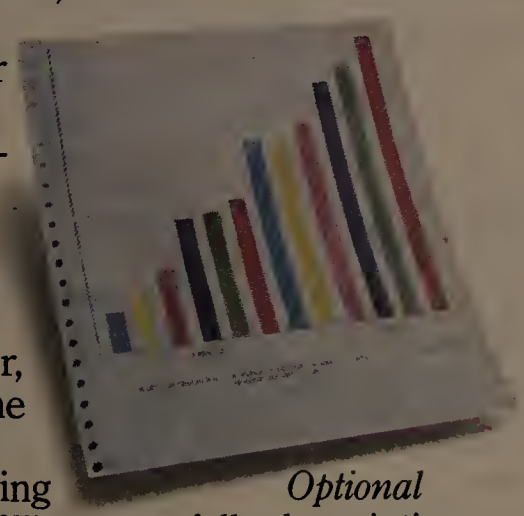
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Two Series of Micros Feature Hard Disks, 8-In. Floppies

OTTAWA — Dy4 Systems, Inc. has introduced two series of microcomputers featuring different performance levels of Winchester hard disks combined with an industry-standard 8-in., double-sided, double-density floppy disk drive.

The Orion VI-A provides a 35.6M-byte, 8-in. Winchester drive, and the Orion VI-B offers a 5¼-in. Winchester hard disk with available densities of 5M, 10M and 20.8M bytes per drive, the vendor said. Both systems run under the Digital Research, Inc. CP/M operating system.

Pricing for the Orion VI series starts at $6,499. Further details may be obtained from Dy4 at 888 Lady Ellen Place, Ottawa, Ont., Canada K1Z 5M1.

Mannesman Tally Announces Cuts On List Prices of T-3000 Printers

KENT, Wash. — Mannesman Tally Corp. has lowered the list price on its 300 line/min T-3000 printers from $5,940 to $4,995, effective immediately.

The printers use two microprocessors that reportedly provide the processing power for self-diagnostics, character font flexibility, high-resolution printing, the ability to download fonts, business graphics and optional asynchronous communications.

Further details are available from the vendor at 8301 S. 180th St., Kent, Wash. 98032.

VLSI Workstation Unveiled

TUCKER, Ga. — Chromatics, Inc. has announced a very large-scale integration (VLSI) workstation for VLSI design and computer-aided engineering applications that features the vendor's Caepac 1 symbolic layout editor for applications involving hand-packed integrated circuit design.

The VLSI workstation contains the firm's CGC color graphics processor and holds 512K bytes of internal memory and up to 40M bytes of Winchester disk storage. In addition, the workstation supports an optional nine-track tape drive, color printer and plotter, the vendor said.

The VLSI workstation costs about $65,000, the vendor said from 2558 Mountain Industrial Blvd., Tucker, Ga. 30084.

MCT2000 Seen Major Advance As System Tool

(Continued from Page 81)

performed to specifications all the way down the checklist, offering:

- Graphics and text editing.
- Single-keystroke display of graphics symbols and text characters.
- Horizontal and vertical scrolling.
- Programmable function keys.
- Single-keystroke file handling.
- Hierarchical file nesting.
- Printing.
- Mass storage.
- Security features.

"All the graphics performed well, but drawing lines from point to point could be improved with the use of a light pen," Riggs commented. "The best feature was the software — to quote a user — it makes documentation a breeze."

Documentation Savings

Creating the documentation required for system development and project control with the MTC2000 realized time savings of approximately 55%, according to Riggs.

Modifications of documentation during the pilot study resulted in time savings of 66%, he added.

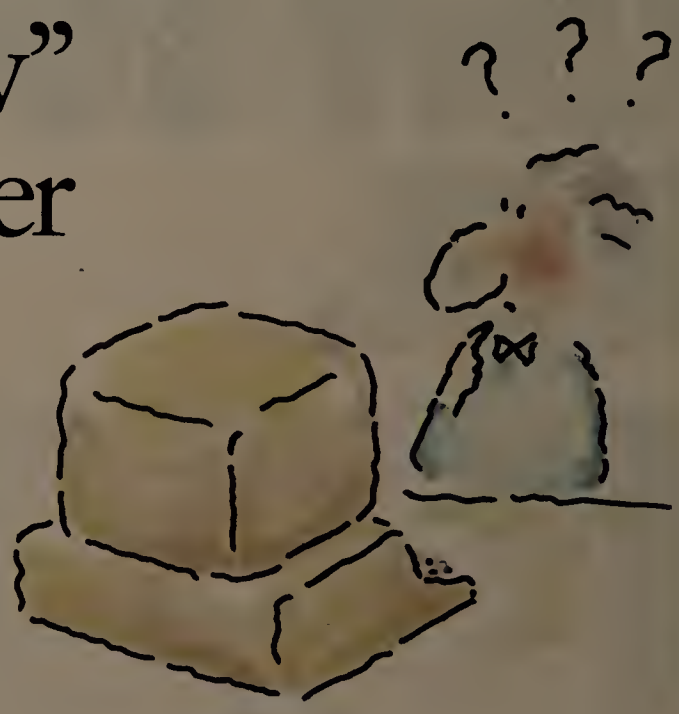
Translated into dollar amounts, Riggs claimed the system saved the company $2,519/mo per workstation. "This gives us a positive return on investment — break even — after nine months."

Riggs compared the product's versatility and functionality to that of a computer-aided design and manufacturing system. "It will reduce access time and research time, maintain logic continuity, facilitate communications between project team members and user department personnel, and it will provide the capability to copy existitng design into the new system.

"The overall ratings given by participants in the pilot study are 43% excellent, 29% very good, 28% good, 0% fair, 0% poor," Riggs noted.

While the system software performs to specification and provides the company with significant benefits in producing development and control documentation, Riggs is presently looking forward to Nastec offering IBM 3270 Synchronous Data Link Control/System Network Architecture capability. He remarked, "3270-host computer interface is extrementlly important to achieve the next level of potential benefits."

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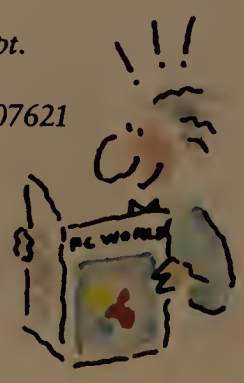
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Bits & Pieces

Quadram's Eram 80 Card Doubles Apple Text Display

NORCROSS, Ga. — Quadram Corp. has unveiled Eram 80, a peripheral card designed to double the amount of text that can be displayed on the Apple Computer, Inc. Apple IIe and expands its memory.

Eram 80 reportedly adds 40 extra characters to the Apple IIe's regular format, allowing 80 characters to be displayed per line. The display screen can be programmed for either standard 40 col. — with 64K bytes of random-access memory for auxiliary memory — or extended 80-col. text display, where 1K byte of Eram 80's memory is used to store the extra characters on each line leaving 63K bytes available for auxiliary memory, according to the vendor. Apple IIe users can switch back and forth between the two formats.

Depending on the text format, Eram 80 provides the Apple IIe with either 64K or 63K bytes of memory in addition to the 64K bytes already on the Apple's main logic board.

Retail price for the Eram 80 card is $159. Quadram is located at 4357 Park Drive, Norcross, Ga. 30039.

Inner Access Announces 68000-Based CPU Board

BELMONT, Calif. — Inner Access Corp. has announced a processor board for process control applications.

Based on the Motorola Corp. 68000 microprocessor, the board can address up to 16M bytes of random-access memory and can accommodate 8K bytes of read-only memory.

The unit costs $695, the vendor said from 517-K Marine View, Belmont, Calif. 94002.

A.B. Dick Offers Price Cuts On Its Magna III, Printer

CHICAGO — A.B. Dick Co. has announced a 20% price cut on its Magna III shared resource information processing system workstation, and a 17% price cut on its intelligent printer.

The Magna III workstation has been reduced from $7,500 to $5,970, and the printer from $6,000 to $5,000. The standard Magna III configuration includes a keyboard, 20-line CRT and a printer. The system uses 5¼-in. double-sided, double-density diskettes, capable of storing up to 273,000 char. each, the vendor said.

A.B. Dick is headquartered at 5700 W. Touhy Ave., Chicago, Ill. 60648.

PCPI Co-Processing Board Compatible With Apples

SAN DIEGO — Personal Computer Products, Inc. (PCPI) has released a co-processing board, the PCPI 88Card, said to be plug-compatible with Apple Computer, Inc.'s Apple II, II+, IIe and other compatible microcomputers.

Functioning primarily as a developer's tool, the 88Card allows developers to use Apple computers to write applications software under Microsoft Inc.'s MS-DOS for the IBM Personal Computer.

The 16-bit co-processing board comes standard with 64K bytes of onboard memory, but can address 128K bytes when added to a 64K-byte Apple II.

The 88Card reportedly comes with Microsoft's MS-DOS and Mbasic and retails for $595. PCPI is located at 16776 Bernardo Center Drive, San Diego, Calif. 92128.

3M Diskette Cleaning Kit Out in 5¼-In., 8-In. Sizes

ST. PAUL, Minn. — The 3M Corp. has announced diskette cleaning kits in sizes of 5¼-in. and 8-in., said to be usable on both 48 track/in. and 96 track/in. drives.

The Scotch 7440 head cleaning diskette kit contains two diskettes and enough individual packets of cleaning solution for 30 cleanings, a vendor spokesman said.

The kit carries a $33.30 price tag. 3M at Box 33600, St. Paul, Minn. 55119.

Datamation Memory Board Fits Prime, Compatible CPUs

PHOENIX — A division of Datamation Services Co., 1st Solutions, has announced the P1024A, a 1M-byte memory board for Prime Computer, Inc. and compatible processors.

The board was developed and is manufactured under a joint agreement with Cybersys, Inc. of Ann Arbor, Mich. The board will operate Prime 100 and larger systems, the vendor said.

The vendor is located at 2001 E. Campbell Drive, Phoenix, Ariz. 85016.

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   FETCH I/O Active     (.68)|    .   .   .   .|         (.60)|-----)   .   .   .|
 APPLICATION PROGRAM     1.77|)   .   .   .   .|         1.94|-----------------).|
   DL/I-CTL Using CPU  (0.02)|    .   .   .   .|         (.08)|        .   .   .   .|
   IRLM ENQ Wait       (1.75)|)   .   .   .   .|      (1.86)|-----------------).|
 SYNC POINT              4.26|=)  .   .   .   .|          .86|--------)..   .   .|
   LTWA Wait           (4.26)|=)  .   .   .   .|         (.86)|--------)..   .   .|
 OUTPUT QUEUE            1.17|    .   .   .   .|          .20|-)   .   .   .   .|
   Node Busy           (1.16)|    .   .   .   .|         (.20)|-)   .   .   .   .|
 OUTPUT COMMUNICATIONS   2.36|)   .   .   .   .|         1.52|--------------)   .|
   MFSP Pool Space     (2.35)|)   .   .   .   .|      (1.52)|--------------)   .|
                             |-------------------|            |-------------------|
 RESPONSE TIME (SEC)    50.19|     79 SAMPLES    |         7.97|   1,039 SAMPLES   |
 # OF TRANSACTIONS         67|   0 MIN/39 SEC    |          856|    8 MIN/39 SEC   |
```

Slowdowns in response time are usually caused by transactions waiting for some IMS resource. WORKLOAD WAIT eliminates guesswork by quickly showing you exactly *where* the bottleneck is—so you can concentrate on solving the problem rather than trying to find it.

```
_ BOOLE & BABBAGE                                   IMF/WORKLOAD MONITOR  1.0
  PLOT  SERVICE          ASYNC PLOTTER          DATE  82/08/28      TIME  09:51:08
  @RSPT

                  AVERAGE RESPONSE TIME  (TRANSACTION)          START   07:05:0
                  PERIOD 00:10:00    INTERVAL 00:01:00          ELAPSED  02:46:0
 AVG/INTVL  .----+----|----+----|----+----|----+----|----+----|----+----|  -- SECONDS ---
   TOTAL    .**********************************      W                .       3.0
   PREV PD  .************************************W                    .       3.7
   CURR PD  .**********************************    W                    .       3.3
 INTERVALS  .----+----|----+----|----+----|----+----|----+----|----+----|
  09:42:00  .************************************ W                              3.5
  09:43:00  .************************************W                    .       3.7
  09:44:00  .**********************************    W                    .       3.1
  09:45:00->.****************************          W                    .       2.8
  09:46:00  .**********************************    W                    .       3.3
  09:47:00  .************************              W                    .       2.5
  09:48:00  .**********************************    W                    .       3.0
  09:49:00  .************************************  W                    .       3.3
  09:50:00  .************************************W*                     .       4.1
  09:51:00  .************************************W**********            .       4.7
            .----+----|----+----|----+----|----+----|----+----|----+----|  MAX at 09:51:0
                 0         1.0       2.0       3.0       4.0       5.0
 RANGE:           0-->1.0   1.0-->2.0   2.0-->3.0   3.1-->4.0   4.1-->4.7   --TOTAL--
 DIST :       13     8%    30    18%   103    62%    15     9%     5     3%    166 100%
```

The on-line IMF MONITOR PLOTS present the activity patterns for the hundreds of monitored IMS items. They show you whether exceptions are transient, or trending toward a problem condition. Activate the Automatic Screen Refresh, and a response time plot is a continuous realtime picture of user service delivery.

```
_BOOLE & BABBAGE                                    IMS MANAGEMENT FACILITIES 1.0
  MHELP SERVICE IMF WM/RM SERVICES MENU      DATE  83/01/01      TIME  08:52:35

  CODE  SEC TYP -----SERVICE------------     CODE  SEC TYP -----SERVICE---------
  MFSIO       C   MFS I/O                   PRCPR       C   TRANS PROCESSED (PGM)
  MFSIR       C   MFS IMMEDIATE REQUESTS    SCHFL       C   SCHED FAILURES (TYPE)
  MFSFD       P   % MFS BLKS FOUND IN POOL  MSGT        W   MSG CALLS PER SCHED
  QIO         C   QUEUE I/O                 MSGGU       W   MSG CALLS PER MGU
  QWAIT       C   QUEUING WAITS             DBTOT       W   DB CALLS PER SCHED
  INQTR       S   INPUT Q LENGTH (TRANS)    DBGU        W   DB CALLS PER MGU
  INQCL       S   INPUT Q LENGTH (CLASS)    WAIT        W   REGION IN A LONG PI
  IQSCL       S   SCHED INPUT Q (CLASS)     DBIO        C   DATA BASE I/O SUBPOOL
  OQLT        S   OUTPUT Q LENGTH (LTERM)   DBSTL       C   DB BFR STEALS SUBPOOL
  OQLN        S   OUTPUT Q LENGTH (LINE)    VDBIO       C   VSAM DB I/O SUBPOOL
  OUTLT       C   MESSAGES OUTPUT (LTERM)   VDBWR       C   VSAM WRITES SUBPOOL
  OUTLN       C   MESSAGES OUTPUT (LINE)    PIENQ       S   PI ENQUEUES (REGION)
  SHMSG       P   SHMSG QUEUE % UTIL        DBLLG       P   DYNAMIC LOG % UTIL
  LGMSG       P   LGMSG QUEUE % UTIL        RDSLG       P   DISK LOG % UTILIZED
  QBLKS       P   QBLKS % UTILIZATION       PIPL        P   PI POOL % UTILIZED
  ARVTR       C   TRANS ARRIVALS (TRANS)    CIOP        P   CIOP % UTILIZATION
  ARVCL       C   TRANS ARRIVALS (CLASS)    CWAP        P   CWAP % UTILIZATION
  ARVPR       C   TRANS ARRIVALS (PROGRAM)  WKAP        P   WKAP % UTILIZATION
  PRCTR       C   TRANS PROCESSED (TRANS)   PSBW        P   PSBW POOL % UTILIZED
  PRCCL       C   TRANS PROCESSED (CLASS)   DBWP        P   DBWP % UTILIZATION
```

Each IMF product has a HELP SERVICES MENU of the hundreds of items you can analyze, monitor or plot. You choose which group of user transactions, or which IMS resources, you want IMF to monitor or you want to investigate.

```
_BOOLE & BABBAGE                                    IMF/WORKLOAD ANALYZER 1.0
 TRANQ SERVICE      TRANSACTION QUEUE STATUS    DATE  82/12/08      TIME  10:15:30

  TRANCODE   PARALLEL          PSB      TRANSACTION
   NAME      LIMIT    CLASS    NAME       COUNT          TRANSACTION STATUS
 TE4CODEL        0        1   PE4CODEL       0    DIRECTORY INITIALIZATION FAILED
 TE4COINQ        0        1   PE4COINQ       0    DIRECTORY INITIALIZATION FAILED
 TE4CONEW        0        1   PE4CORDR       0    DIRECTORY INITIALIZATION FAILED
 THDAMINQ        1        1   PHDAMINQ      10    SMB IS ENQUEUED ON TCT
 THDAMUPD        0        2   PHDAMUPD       0    PSB IS TP PROGRAM
 THIDMINQ        0        1   PHIDMINQ       0    PSB IS TP PROGRAM
 THIDMUPD        0        2   PHIDMUPD       0    PSB IS TP PROGRAM
 THISMINQ        1        1   PHISMINQ       0    PSB IS TP PROGRAM
 THISMUPD        0        2   PHISMUPD       0    PSB IS TP PROGRAM
 TMSG1           0        1   PMSG1          0    PSB IS TP PROGRAM
 TMSG2           0        2   PMSG2          0    DIRECTORY INITIALIZATION FAILED
 TMSG3           0        3   PMSG3          0    DIRECTORY INITIALIZATION FAILED
```

TRANSACTION QUEUE STATUS actually displays the transactions sitting on the input queue. Another unique IMF feature, it's far more than a simple display of queue status—it shows you exactly what user work is sitting in the queue waiting to be processed.

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WINDOWS.

```
BOOLE & BABBAGE                                    IMF/RESOURCE ANALYZER 1.0

STAT  SERVICE  SYSTEM STATUS                 DATE  82/12/08      TIME  14:52:30

RGN      1    2    3    4    5    6    7    8    9   10   11   12   13   14   15
TYPE BWFI BWFI  MPP  MPP  MPP  BMP
STAT DL/I WF-W ACTV SCHD IDLE ACTV INAC INAC INAC INAC
WARN W-PI      NOBK
                    TOTAL        FREE    %    ALLOCATED    %   *** WARNING ***
--IMS DATA SETS--
  SHORT             5,500       1,925   35        3,575   65      (HI=   3602)
  LONG              7,200       1,080   15        6,120   85   <---THRESHOLD
  QBLKS             1,600         800   50          800   50      (HI=   1263)
  DYN LOG           7,200           0    0        7,200  100   <---WRAPPED
  DISK LOG          4,800       2,600   54        2,200   46
--PI POOL--
  CURRENT          92,160      90,768   99        1,392    1
  MAXIMUM         204,800     203,408  100        1,392    0
--STOPPED RESOURCES--  LINES:    2   TRANS:    0   DB'S:    1   RTCDE'S:  5
  RESTART TIME   07:38:26
--SCHEDULING--   FAILURES:   18,540  30%   SCHEDULING STOPPED   <---DYNAMIC LOG
  CLASS    001      002      003      004      005      006     REST    FP      TOTAL
  Q'D        0      75*        2        9        1        0      28*    0        116*
  PROC   10968    29154     3322     6008    14076      105     1406    0      65039
```

A time-saving first step in analyzing IMS operation, the SYSTEM STATUS display tells you at a glance whether or not things are okay. Should further analysis be required, you can select specific areas to investigate with the IMF analyzers.

```
BOOLE & BABBAGE                                    IMF/WORKLOAD ANALYZER 1.0
DTRAC SERVICE  DISPLAY WORKLOAD TRACE         DATE  82/12/08     TIME  11:14:30
                                                        TRACENO=  4
Trancode: DB91T01  Ltrm:MASTER   Node:G99992C  Class:  1  Arrive-07:28:53.3
  Start-07:28:53.3  Stop-07:28:55.5  Elapsed-  1.7 sec  Response Time-  1.7sec
  DC Calls:1,105 DB Calls:    0 #I/O:   0  Appl CPU  345 msec IMS CPU  226 msec
-------------------------------------------------------------------------------
Trancode: DB91T01  Ltrm:MASTER   Node:G99992C  Class:  1  Arrive-07:29:31.1
  Start-07:29:31.1  Stop-07:29:35.5  Elapsed-  4.0 sec  Response Time-  4.0sec
  DC Calls:1,190 DB Calls:    0 #I/O:   0  Appl CPU  294 msec IMS CPU1,943 msec
-------------------------------------------------------------------------------
Trancode: EDTX900  Ltrm:A03581AR Node:A03581AR Class:  3  Arrive-07:30:36.6
  Start-07:30:37.7  Stop-07:30:43.3  Elapsed-  6.5 sec  Response Time-  6.8sec
  DC Calls:    2 DB Calls:    9 #I/O:   3  Appl CPU    6 msec IMS CPU  392 msec
-------------------------------------------------------------------------------
Trancode: EDTX900  Ltrm:A03581AR Node:A03581AR Class:  3  Arrive-07:30:49.9
  Start-07:30:49.9  Stop-07:30:49.9  Elapsed-  0.3 sec  Response Time-  0.3sec
  DC Calls:    4 DB Calls:    0 #I/O:   0  Appl CPU    0 msec IMS CPU    2 msec
-------------------------------------------------------------------------------
------------------- TOTAL OF ALL TRACES -------------------------------------
Trancode: ALL      #Trans:   15 AVG DC CALLS:162.2 AVG DB CALLS:  6.1
  AVG APPL CPU  119 msec  AVG IMS CPU:  152 msec AVG # I/O: 4.66
  AVG I/Q TIME  0.1sec    AVG E/T TIME  2.3sec   AVG RESP TIME:  2.4sec
```

WORKLOAD TRACE, an entirely unique service, provides a detailed, on-line trace of the life of any transaction — or group of them — inside IMS. Unlike IBM'S DC Monitor, it shows you only what you want to see — immediately, and without the high overhead.

```
BOOLE & BABBAGE                                    IMF/RESOURCE ANALYZER 1.0
DSPST SERVICE      DISPATCHER STATISTICS    DATE  82/12/08      TIME  14:53:32

***** OS DISPATCHER *****
REGION    TYPE     ASID   DSP/SEQ    SRV.UNITS   TCB CPU   DOMAIN   PFGR   PFPD
  0      CONTROL     9    241/  6    2,428,068     4,328       13     13      1
  1      BMP-WFI    11    239/  9      129,452        60        1      1      1
  2      BMP-WFI    15    118/ 12          488        66        1      1      1
  3      MPP        12    240/  7      448,724     1,400       13     13      1
  4      MPP        10    238/ 10    1,014,360     1,750       13     13      1
  5      MPP        14    239/  8      814,360     2,248       13     13      1
  6      BMP        13    117/ 13       44,122        25        1      1      1

***** IMS DISPATCHER *****
      60 TOTAL SAPS                    0/      0 HIGH SAP WAITERS (PRV/NON)
      30 DYNAMIC SAPS                  0/      0 WAITING FOR SAP (PRV/NON)
                                       0/      0 TOTAL WAITED FOR SAP (PRV/NON)

       6 DEPENDENT REGIONS
       3 ACTIVE BMP REGIONS          393,684 TOTAL ITASKS CREATED
       1 ACTIVE MPP REGIONS        3,342,817 TOTAL ITASKS DISPATCHED

       9 ACTIVE ITASKS                   0 TOTAL SELECTIVE DSP EVENTS
       0 ISWITCHED ITASKS          154,051 TOTAL IPOST CALLS
```

DISPATCHER STATISTICS gives a quick summary of activity across all active IMS processing regions, showing whether MVS is providing the service you expect the SRM to deliver. This lets you see if IMS is getting the resources needed to process the work.

```
BOOLE & BABBAGE                                    IMF/RESOURCE ANALYZER 1.0
SCHED SERVICE  SCHEDULING STATISTICS       DATE  82/12/08      TIME  14:33:16

                        SCHEDULING ACTIVITY

    61,417 TOTAL SMBS EXAMINED                19 TOTAL PROGRAM CONFLICTS
                                               0 TOTAL PRIORITY CUTOFFS
    42,877 TOTAL SCHEDULED  70%               45 TOTAL INTENT FAILURES
    18,540 TOTAL FAILURES   30%           18,476 TOTAL OTHER REASONS

                     SCHEDULER SEQUENCE QUEUE

   REASON FOR WAIT          RGN  TYPE  CLASSES   CPRTY  PSBNAME TRANCODE
WAITING FOR MESSAGE (IDLE)   3   MPP   1
WAITING FOR INTENT (DB)      4   MPP   3  4        10
WAITING FOR GU (WFI)         1   BMP                     GISPSB  GIS
```

SCHEDULING STATISTICS shows unsuccessful as well as successful schedule attempts. It also indicates the reasons why attempts have failed, allowing you to take appropriate corrective action quickly, without the traditional trial-and-error guesswork.

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CW Photo by J. Bartimo

Oron South

IRS Restructuring Used as Model For Introducing DP

By Jim Bartimo
CW Staff

DANVERS, Mass. — Using the Internal Revenue Service's recently proposed reorganization as a case study, independent consultant to the IRS, Oron South, explained how to avoid some of the managerial problems that may arise from the introduction of new technology to an organization.

South made his comments here last week at the conference, "The New Technologies: Impacts on People, Organizations and You," sponsored by the Organization Development Network of Plainfield, N.J.

Summarizing what the IRS reorganization involves, South said, "The IRS has had mainframe computers — the type where you submit a request and get your report a month later. But that's changing,

(Continued on Page 90)

Wang Adds Two Systems To OIS Word Processors

LOWELL, Mass. — Wang Laboratories, Inc. has added two systems to its Office Information System (OIS) series of word processors, both of which feature data processing and networking capabilities.

The OIS 40 supports Wang's word processing and can be connected to larger OIS systems or act as a node in Wang's broadband local-area network, Wangnet. Basic configuration of the system includes a workstation with a detached keyboard and a tilt and swivel display monitor.

Other features of the system include a 5¼-in. 10M-byte fixed disk, a 5¼-in. 320K-byte disk drive and a 20 char./sec. daisywheel printer. The OIS 40 can be upgraded to Wang's second introduction — the OIS 50.

The OIS 50, with all the functions of the OIS 40, can be clustered to support multiple users and can support faster printers, including the vendor's laser printer, according to Wang.

Standard software for both machines is Wang's word processing: Glossary, for retrieving and displaying commonly used words, phrases or paragraphs; Decision Processing, for automating word processing commands to respond to two-key prompts; Sort, for performing an alphanumeric sort on records; System Security for password protection; and the Math Support Package for performing common mathematical functions, a vendor spokesman said.

Digital Research, Inc.'s operating system, CP/M, can run on the systems as an option, a vendor spokesman said.

Data processing can be acheived on both systems through local and remote networking. Wangnet is said to transmit information sent by either system within the local site to other Wang OIS and VS systems.

Remote Wangnet is said to provide users with a mix of centralized and distributed processing to link them to Wang systems in remote locations.

Optional industry protocols that the systems will support include IBM's 3274 Systems Network Architecture and IBM 3271 Emulation, according to a vendor spokesman.

The base price of the OIS 40 is $8,200, and it is available in June. An entry-system configuration of the OIS 50 costs $9,800, and is also available in June. Additional workstations can be added to the OIS 50 for $2,600 per workstation. More information is available from Wang Laboratories, Inc., One Industrial Ave., Lowell, Mass. 01851.

Wordstream Group Unveils WP System

HOUSTON — The Wordstream Users' Group has introduced a stand-alone word processing system said to feature a full screen display, dual 8-in. floppy disks and a Qume Corp. 45 char./sec. printer.

The WS-600 features include letter-writing capability, a 30,000-word spelling checker, column verification and proportional spacing. The word processer is fully compatible with the Wordstream product line, which reportedly has been revived by the users' group. Wordstream products had been offered by MAI Basic Four.

The WS-600 is available for $8,500 from the Wordstream Users' Group, 2314 Cheshire Lane, Houston, Texas 77092.

Industry Advised Against Premature Legislation

By Robert Batt
CW West Coast Bureau

PHOENIX — By introducing CRT terminals into the integrated office, users may be opening a Pandora's Box of greater government intervention into office technology issues, an expert on public law and government said here recently.

Speaking before a group of computer vendors at the spring meeting of the Computer and Business Equipment Manufacturers Association (Cbema), Alan Westin, a professor at Columbia University, said it is essential for the computer industry to hold off unwise and premature legislation that may result from a lack of interest in ergonomic issues by industry.

The marriage of word processing and data processing in the 1980s will impact 80% of office workers. This will lead to a debate that will be part of a much bigger process, Westin predicted, in which individual jobs, work groups, line supervision and management decision-making will be affected.

"The office technology issue is unfolding at a time of economic recession and a deepening uncertainty over work and how it will be shaped by information technology," Westin said. "The controversy is going to increase over the next few years because video terminals go to the heart of peoples' fears about bad working conditions, health hazards and new technology in general."

Key issues that will arise include possible "de-skilling" of workers through the introduction of office automation, bringing assembly line techniques to the office environment, increasing job surveillance, devaluing certain jobs and increasing stress, Westin said.

The role of government will therefore be critical to the future of office technology, Westin claimed, particularly in the areas of ergonomic standards, licensing, mandated employee participation and tort

(Continued on Page 92)

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WP Society Changes Name To Office Tech Management

MILWAUKEE — The Word Processing Society, Inc. has changed its name to the Office Technology Management Association effective May 1, the organization's board of directors announced.

The new name was chosen after a contest in which all members of the society participated.

The board chose the new name because it is most descriptive of the organization's goal to help its membership manage technology, a spokesman said.

More information on the Association can be obtained from Suite 101, 9401 W. Beloit Road, Milwaukee, Wis. 53227.

IRS Regrouping Used as DP Model

(Continued from Page 89)

now they're trying to create workstations."

The workstation will be used by senior management and clerical workers alike in field offices around the country, and each will provide a number of tasks including word processing and networking. "Each station will be capable of entry, storage, retrieval, analysis and manipulation," South said. The workstations will be linked in a network.

As a temporary consultant whose job it is to stay with the IRS for two or three years and then move on, South is concerned with how the technology should best be implemented and its effect on workers. "The issue is to get people to work smarter — not harder," he said.

Calling Americans "machine happy," South said that far too much emphasis is placed on the technology and not enough emphasis on people. "The revolution is not technical — it's organizational," he said. "The potential is not in the machine — it's in the organization."

South's first step was to conduct an information search on how the technology would affect the organization. He investigated what would be different about the information environment, the roles of different levels of managers and potential resources such as consultants and organizations.

Finding that goals needed to be defined more clearly, South suggested that policies be set and that there be role clarification and reeducation of workers. He also found that implementation of technology in the many field offices should be "simultaneous rather than sequential" to ensure an even development of technology.

South also spoke about the use of symbols in introducing technology. For instance, if you call a secretary in for training on a workstation without defining the position's new role, "you're saying that you're just replacing the typewriter," he said.

OCR System Serves Wang

NORTHRIDGE, Calif. — Totec U.S.A. has announced an interface capability for its TO-5000 desktop optical character recognition (OCR) system with Wang Laboratories, Inc.'s VS office system.

The interface capability enables format codes — including tabs, indents, underscore and others — to be read by TO-5000, a multifont OCR that reads 300 page/hour.

The price of the OCR is $9,950 from Totec at 19151 Parthenia Ave., Northridge, Calif. 91324.



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Form Letter Data Manager Added to WP Line for Apples

NEW YORK — Kensington Microware Ltd. has announced that it will include a form letter data base manager with its word processing software for the Apple Computer, Inc. Apple II+, Apple IIe and other "work-alike" computers.

The Format II Enhanced Version package is said to permit flexible form letter preparation and label printing.

When a particular word or set of characters is encountered in the text file that serves as a base document, the program checks its data base for information corresponding to that same label.

The package is available for $150 from Kensington Microware Ltd., 919 Third Ave., New York, N.Y. 10022.

OSI Increases E-Mail System Price

FORT LEE, N.J. — On-Line Software International (OSI) has announced a price increase on its Omnicom electronic mail system. Effective June 1, the price for Release 3 will begin at $28,000 for DOS and $35,000 for OS systems.

Compatible with any single or multiple CPU network running CICS, Omnicom is designed for the nontechnical user. The package is menu-driven, and sign-on requires only a mailbox name and password. Omnicom also enables messages to be addressed to individuals or groups by proper name, the spokesman said.

OSI is located at Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Tool Targets System/34 Users

WINTER PARK, Fla. — Westmoreland Systems, Inc. has introduced a software package for the IBM System/34 said to allow an office to organize paperwork and document files so that they can be easily accessed through the use of key words.

The Document Retrieval System assigns a document number representing the physical location of that document and up to five key words. The document can then be retrieved by entering any or all of the key words, a vendor spokesman said.

The package is available for $300 with a 30-day money back guarantee from Westmoreland, Suite I, 228 Park Ave., Winter Park, Fla. 32789.

Facit/Dataroyal Announces Daisy Printer

NASHUA, N.H. — Facit/Dataroyal, a division of Facit, Inc., has introduced a letter-quality daisywheel printer.

The Model 4565 is being marketed mainly for use with Facit word processing systems and other small business applications. The unit reportedly prints fixed and proportional pitch text at up to 40 char./sec using a 96-char. Diablo Systems, Inc./Qume Corp.-compatible print wheel. Standard features include a 2K-byte buffer, unidirectional character-by-character printing and bidirectional line-by-line printing.

The unit costs $1,895 from the vendor at 235 Main Dunstable Road, Nashua, N.H. 03061.

Prof. Warns Of Legislation

(Continued from Page 89)

liabilities.

A variety of articulate, well-organized groups — such as labor unions, women's activist groups and academics — have been brought together over the issue of VDTs and the quality of the working environment, Westin said.

To avoid the threat of an employee backlash against VDTs there is a need to research what is really happening. "The health issue, for example, is becoming a growing concern for management," Westin said. "Users want a lot more information from management than they have been getting to date."

Westin called for a sophisticated national survey of the industry, possibly sponsored by Cbema, which would study the use of VDTs in various occupations and regions.

While there is no evidence that VDTs emit excessive radiation, there is evidence that they cause stress and that very few user sites are dealing with this problem, according to Westin.

But one company, Aetna Casualty and Surety Co., has dealt with this issue, Westin said. The company has adopted a master VDT plan approved by top management and created a "People/Technology Programs Unit" to communicate with employees on technology issues.

"We need some solid research to clarify the issues and serve users in a credible and responsible way so that they can venture into this area without undue risk," Westin concluded.

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Custom Mode	Yes	No	No	No	No
Keyboard LED's	Yes	No	No	No	No
25th Status Line	Yes	Yes	No	No	No
2-Speed Smooth Scroll	Yes	No	No	No	No
Graphics Characters	Yes	Yes	No	No	No
Configurable Print & Send	Yes	Yes	No	No	No
Set Up Mode	Yes	Yes	No	No	Yes
Settable Tabs	Yes	Yes	No	No	Yes
Choose Protected Attribute	Yes	Yes	No	No	No
Screen Saver	Yes	No	No	No	Yes
Alternate Character Generator	Opt	No	No	No	No
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Panel Recommends Government Review Of Tech Innovation

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A blue-ribbon panel of the National Academy of Sciences and the National Academy of Engineering recently recommended a high-level U.S. government review of the international competitiveness of American technological innovation.

"The U.S.' advanced technology enterprise has been undervalued in the past in the national scheme of priorities and must be held as one of the country's most valued objectives," the panel said in delivering its report to a Senate committee.

The report recommended a number of steps to coordinate government and private sector efforts to foster U.S. innovation and enhance its competitiveness vis-a-vis this country's industrialized allies.

The special panel was commissioned in late 1981 by the National Research Council, the operating arm of the two academies, to focus on relations among the major industrialized nations — the U.S., Canada, West Germany, the UK, France and Japan. The group included representatives of industry, govern-

(Continued on Page 96)

Execs Join Forces, Sell Firm For $14 Million to Cullinet

By Bill Laberis
CW Staff

WESTWOOD, Mass. — It is said that great minds think alike, especially when faced with similar problems like a crushing information overload. Take the case of David Friend and Phil Cooper, who founded Computer Pictures Corp. in 1980 and, just 2½-years later, sold their company to Cullinet Software, Inc. for $14 million in cash.

Both now work for Cullinet, Cooper as vice-president of marketing and Friend as a consultant, and claim the expertise they brought to their new employer along with Computer Pictures is embodied in the products announced by Cullinet last week (see related story). The acquisition also gave Cooper more time to fly his airplane, bought with part of his Computer Pictures winnings, and Friend the time to train for last week's Boston Marathon, they said at a recent interview.

But just a few years ago, Cooper and Friend were unknown to one another, working in entirely different fields, each facing the dilemma of how best to pull reams of information together to make prudent business decisions.

For Friend, a glimmer of light at the end of the decision support tunnel came five years ago when he saw an advertise-



David Friend

ment for a small graphics terminal "with a snappy looking chart on the screen," he said. He bought the terminal to aid him in running his small electronics business, but discovered the chart displayed in the advertisement "had been pasted onto the

(Continued on Page 98)

Big Blue Earnings Up 24% From Last Year

By Tom Henkel
CW Staff

ARMONK, N.Y. — Big Blue appears headed for another green year. The firm recently reported that first-quarter earnings increased nearly 24% over the same time last year, while revenues jumped 44%. Revenue from equipment rentals fell 9.4%, further evidence of IBM's pricing strategy emphasizing purchase over rental.

Net earnings totaled $976 million or $1.62 per share, up from $789 million the first quarter of 1982. Aftertax margins were up to 11.8%, a .6% increase over the same period a year ago, IBM said.

Worldwide revenues totaled $8.29 billion in the first quarter, up 17.3% from a year ago. IBM Chairman John R. Opel said worldwide IBM installations increased, but declined to elaborate.

Average shares outstanding jumped to 603 million in the first quarter of 1983

(Continued on Page 94)

Over Two Years

Slow Harris Recovery Predicted

By Bill Laberis
CW Staff

NEW YORK — It will be another two years before Harris Corp. completely digs out of the recession and reports "normal" profits instead of the quarterly earnings slides of the past year.

'Over the years, we have failed to achieve the same depth of skills and management structure in our marketing organization that we have achieved, for example, in engineering.' — Dr. Joseph A. Boyd, Harris Corp. chairman and chief executive officer.

But for the remainder of this year, earnings from one quarter to the next will improve slightly as the company's product offerings increase and the economy improves.

This was the message delivered by Dr. Joseph A. Boyd, Harris' chairman and chief executive officer, before a meeting of the New York Society of Security Analysts here recently.

Boyd predicted that the company's earnings for the first three months of 1983 would be $12.3 million. This profit would be significantly lower than the 18% return on equity Boyd claimed Harris would attain by 1985.

In revealing several elements of the Harris game plan in the coming years,

(Continued on Page 96)

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SNA vs. OSI in '80s

Standards Delays, Vendor-User Battles Predicted

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — More delays in the development of a comprehensive local-area network standard and increased confrontation between users and vendors were forecast here recently at the Ninth Federal DP Expo.

Network Consultant Frances X. Dzubeck, chairman of a conference session also indicated that the major standards battle of the 1980s will be between Systems Network Architecture (SNA), IBM's proprietary communications protocol, and standards based on the Open Systems Interconnection (OSI) model developed by the International Standards Organization (ISO).

OSI is also supported by American Bell, Inc. AT&T's new de-regulated subsidiary, and is being implemented in Advanced Information System/Net 1000, American Bell's smart network service, which competes directly with IBM's SNA-based network offerings.

Office Systems

The user/vendor confrontation has already impacted automated office systems, Dzubeck said. A multitude of word processors, file servers, workstations and related devices are now available, but most of them can talk only to equipment of the same make.

This problem is not likely to diminish, he added, because the automated office market is expanding rapidly. Further, many suppliers believe standardization limits their ability to innovate, adds to their costs and leaves them open to increased competition, despite public protestations to the contrary, Dzubeck continued.

Local-area networks represent another area where vendor rivalry is delaying standardization.

While a committee of the Institute of Electrical and Electronics Engineers (IEEE) has almost completed work on a standard for baseband-type local nets, it is not likely to attract universal support, Dzubeck said. A vendor group led by Sytek, Inc. recently persuaded the committee to begin developing an interface standard for broadband-type local-area networks.

Transport-Level Protocol

Despite this marketplace controversy, the technicians are forging ahead. ISO, within "the next few months," probably will unveil the draft of a "transport-level" protocol to supplement X.25, according to consultant Eric Siegel, another speaker at DP Expo.

The transport level is the fourth one in the seven-level OSI model. X.25 encompasses the lowest three levels. Honeywell, Inc., Siegel added, recently has developed a commercial version of the ISO protocol.

Additional transport-level communications protocols are available from such firms as IBM, Digital Equipment Corp., Sperry Corp. and Honeywell, Inc., Siegel said, but each is a "closed" system that, with some exceptions, does not allow communications with another manufacturers's terminal or computer equipment.

Preliminary State

Standards implementing the topmost layers of the OSI model are still in a preliminary state for the most part, Siegel said.

The U.S. Department of Defense has developed three machine-independent protocols in this area, and has implemented them on its Defense Data Network and the Arpanet. One, called Telnet, provides communications among any of several terminal makes and types by converting each of them into virtual teletypewriters. The other two protocols provide standardized data formats for transferring files and exchanging electronic mail.

He also pointed out that development of internetworking protocols has now reached a point where users attached to most of the world's packetized communications networks should be able to exchange messages with each other "within two years."

IBM: Another 'Black-n-Blue' Year

(Continued from Page 93)

from 593 million last year. Furthermore, earnings before taxes were up 26.9% in the first quarter at $1.79 billion, IBM said.

Income from services was up 18.1% over 1982 at $1,738 million, as were IBM's costs for sales, rentals services and expense, which rose nearly 27% to $6.6 billion.

First-quarter financial results show a continuation of the high-growth, high-profit path IBM has been following for the past several quarters. The company closed out 1982 with a 28% boost in fourth-quarter earnings and a 23% increase in profits for the same quarter. Full-year 1982 profits were up 22% over 1981 with earnings of $4.4 billion or $7.39 a share, an IBM spokesman said.

IBM's jump in profits last year was noted recently in *Fortune* magazine's survey of the nation's 500 leading industrial corporations. IBM moved up the Fortune 500 ladder to become the sixth largest corporation in the country, based on revenues. Accordingly, Big Blue also was able to become the most profitable of all such companies.

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June 7-10 . . . . . Philadelphia

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May 24-26 . . . . . Seattle
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June 13-15 . . . . New Jersey
June 13-15 . . . . . Texas
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May 2-4 . . . . . Boston
June 13-15 . . . . Philadelphia

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May 23-26 . . . . . Boston

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Harris Earnings to Rise Only Slightly: CEO Boyd

(Continued from Page 93)

Boyd told the analysts Harris has no major acquisition plans at this time. Harris is putting the final touches on the sale of its printing equipment business, a sale that will net the company $250 million in cash.

Should the company not spend any of the $250 million on acquisitions, Boyd said the funds would provide Harris "with enough to finance operations for many years."

Commenting on one particular problem that had plagued the company and perhaps made the recessionary slide deeper than it might have been, Boyd said, "Over the years, we have failed to achieve the same depth of skills and management structure in our marketing organization that we have achieved, for example, in engineering."

But the main thrust of what Boyd promised would be ambitious sales and profits growth throughout the decade will be supplied by new product offerings. Included in these offerings will be:

- A high-end, 48-bit supermini-computer, to be introduced in 1983. The new model, Boyd said, will be nearly three times as powerful as the company's current high-end supermini, the H-800, and will exceed the performance of any competitor, including Data General Corp.'s recently announced MV 10000. It will be priced in the $325,000 range.
- A word processing product that Boyd said represents "a whole integrated information processing concept." This product, too, will be announced and shipped this year, Boyd said.
- A family of IBM Systems Network Architecture-compatible local-area network products "heavily influenced" by the International Standards Organization's Open Systems Interconnection and Institute of Electrical and Electronics Engineers standards. These products will be based on the Intel Corp. 8086 microprocessor.

Panel Urges Government To Review Tech Enterprise

(Continued from Page 93)

ment, academia and the scientific and legal communities. Officials of IBM, Bell Laboratories, Hewlett-Packard Co. and Motorola, Inc. served on the 22-member board.

The panel concluded that "the nation's innovative capacity should not be thought of only in terms of specific products; it should be understood as the continuous capability, widely diffused throughout the economy, to produce and put to use pioneering technological resources."

The report described innovation, which it called "an essential national resource," as "an interlocking system that must be strong throughout. Its requirements include technologically sophisticated managers, quality research personnel and a technically competent labor force. The process of innovation also requires a healthy supply of capital," the panel said.

Discussing the government's role in technological innovation, the panel noted that unlike France and Japan, "the U.S. has had no national plan nor even a loose coordinating mechanism linking the efforts of [the private sector] to federal government actions." Government actions that affect innovation include tax policies fostering research and development and investment in production facilities, patent laws, regulation and deregulation, antitrust measures, export/import bank loans and government procurement, the report noted.

"The nation's capacity to perform well in advanced technology and trade is, in fact, affected by decisions that are made independently" by numerous departments and agencies, the panel said. "Yet the heads of these executive branch entities rarely, if ever, have joined together to consider the totality of their separate actions on the nation's advanced technology capabilities and international competitiveness — either what it is or what it should be.

"If the U.S. is to maintain its innovative vitality over time, it is essential that executive and congressional policymakers periodically evaluate both the U.S.' comparative international trade position and the health of the nation's innovative capacity," the report said. It recommended this be done by "a broad analysis, conducted at Cabinet level, of all the variables impinging on our capacity to innovate — both domestic and foreign."

The report also stressed the need for multilateral negotiations — and, where necessary, bilateral consultations and unilateral U.S. actions — to preserve open high-technology trade and promote international cooperation in science and technology.

"The costs and risks of protectionist policies and market fragmentation are probably greater than in almost any other economic field except energy," the report said."



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OPM's Trustee Files Suit Against Former Salesman

NEW YORK — The trustee for OPM Leasing Services, Inc. has filed a multimillion dollar suit against a former OPM employee, charging he aided the firm in effecting a massive computer leasing fraud and later defrauded OPM for his own gain.

The suit, filed by James Hassett, charges that former OPM salesman George Prussin and his company, Sha-Li Leasing Associates, Inc., arranged over $7 million in computer leases for OPM, used the leases as collateral to obtain loans, but never executed the leases. Hassett's suit seeks repayment of the $7 million, as well as other unspecified damages.

The suit charges further that Prussin furnished OPM's owners, Mordecai Weissman and Myron Goodman, with blank stationery from a New York bank on which phony leases were forged. Goodman and Weissman are serving 12- and 10-year sentences, respectively, after admitting to their roles in a leasing scheme that netted some $500 million.

Hassett's suit also alleges that Prussin used his knowledge of the illegal activities at OPM to avoid paying his obligations to the company after he left its employ in 1979 and started his own company.

Prussin could not be reached for comment nor did he return calls placed to his New York office.

Execs Pool Efforts, Sell Firm For $14 Million to Cullinet



Phil Cooper

(Continued from Page 93)

screen. You had to completely program the thing to generate the chart, and I thought I was getting something a bit more user-friendly."

Undaunted, Friend began writing his own simple programs, later devising more elaborate programs that could generate some business graphics. From this early tinkering came Trend-Spotter, a graphics package he began marketing with his new company, Friend Information Systems, Inc.

In New York

Meanwhile, in New York, Cooper was "slaving away at a huge public relations company," BBDO, Inc. Unlike Friend, Cooper had no technical background, "just a belief that there had to be a better way of presenting information for decision support other than dumping it all onto computer printouts," Cooper recalled.

The simultaneous appearance at his desk of three mail carts full of computer printouts crystallized in Cooper's mind an idea to develop and market a product "that could tell the story in pictures." Believing he would find the technical talent he needed outside New York, Cooper packed his bags and headed for Boston "with the intention of creating a solution-based, decision support graphics package," knowing full well that most start-up companies begin with great expectations and end in failure.

To his dismay, Cooper found that his lofty venture demanded more technical expertise than he had. But within a few months in Boston he was introduced to Friend, and the two decided to pool Cooper's marketing expertise with Friend's Trend-Spotter.

Rapid Deployment

The plan was to raise a healthy portion of venture capital, then embark on the "rapid deployment of a sales force," Cooper said. It was to their marketing team that both Cooper and Friend attribute much of the success of Computer Pictures.

"With very few exceptions, we did not use people with computer backgrounds; we needed people who could talk to executives in plain English," Cooper said.

"This is where so many other companies with good products failed," Cooper continued. "They tried to market management products by sending out a bunch of engineers who would try to imagine what it is like to be a manager. Then they'd come back and design what they thought was wanted. Invariably, they failed."

Cooper's and Friend's marketing plan for their management graphics packages worked, and Computer Pictures' success was impressive enough to attract the attention of larger companies, including Cullinet. Cooper met Cullinet's founder, John Cullinane, at a technology conference, discussed the acquisition potential of Computer Pictures and consummated the $14 million cash deal within a month.

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To Deal With Technological Change

Exec Urges Creation of Industrywide Association

By Robert Batt
CW West Coast Bureau

PHOENIX — The information industry is ill-equipped to deal with rapid technological change and is too often concerned with reacting to issues instead of generating them.

So said William Conlin, senior vice-president at Burroughs Corp., who called for the establishment of a broad-based computer industry "super group" at the Computer and Business Equipment Manufacturers Association (Cbema) spring meeting here recently.

"The computer industry in 1983 is not organized in such a way as to respond to and manage the diverse and rapidly changing political, social, economic and technological issues that concern us," Conlin said.

The industry, he said, is too fragmented, with many separate groups with conflicting agendas or special interests competing for government attention and money.

Conlin called for the creation of an industrywide association, different in both structure and scope from Cbema. It should encompass the entire computer business, he added, and be active both nationally and internationally.

"Most important of all, it will contain a separate monitoring organization — one that is long-range, issue-oriented and proactive rather than reactive," he added.

A major objective of such an association, Conlin noted, must be to establish industry standards to which vendors can conform, even as new and distinctive products are being manufactured.

"We must work to develop a broad range of standards and criteria for security, for data bases and, in general, for the way we operate, and we need to establish international relationships with our counterparts abroad," he noted.

Conlin said that such an industry-wide association could act as the conduit for all standards, domestic and international. Associations like the Electronic Industry Association would work through the association rather than independently publishing their own standards in the U.S. as they do now.

CW at Cbema

"Proposals for standards will be evaluated with greater foresight and objectivity because input will come from many more sources. It will be easier to decide whether a proposed standard is beneficial to the user/vendor community," he added.

Conlin listed several other advantages to setting up an industrywide association:

The new association, he claimed, would have greater political clout than Cbema because of its broader membership base. It could thus take a more active role in influencing legislation and developing unified legislative strategies.

Very few industry associations have the funds or the broad-based support for this kind of lobbying process. "Ours would," he concluded.

Paradyne Seeks Dismissal of Suit

TAMPA, Fla. — Charging that the Securities and Exchange Commission's (SEC) fraud suit "represents an unprecedented attempt to expand the jurisdiction of the federal securities laws," Paradyne Corp. has sought dismissal of the SEC's complaint, filed last month.

The SEC had charged Paradyne with violations of securities laws in obtaining an $84 million contract from the Social Security administration for the installation of over 2,000 intelligent terminal systems [CW, April 4].

The dismissal motion, filed in U.S. District Court here, claims the SEC had no jurisdiction in the contract matter, adding that the suit attempted to circumvent the federal Contracts Disputes Act.

At least one other federal agency, the office of the inspector general of the Department of Health and Human Services, is also investigating the charges against Paradyne, as is a congressional committee headed by Rep. Jack Brooks (D-Texas).



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Vendors Urged to Ease Client Installation Fears

By Robert Batt
CW West Coast Bureau

PHOENIX — Computer vendors must take the lead in managing the installation of new equipment at user sites if employee fears and concerns about new technology are to be allayed.

Speaking at the spring meeting of the Computer and Business Equipment Manufacturers Association, (Cbema), D.Quinn Mills, professor of business administration at Harvard Business School, said such vendor support is critical if government intervention in new technology issues is to be avoided.

Mills told his audience of senior computer executives: "Where employees are resisting the introduction of technology because your customers — the users — don't know how to install the equipment with a decent concern for working conditions, you must tell them how to install the equipment and manage it with fair regard for the employee."

He said the establishment of model installations that can be studied by users and the training of user staff is an urgent priority. Technical assistance in actual installations and advice to customers on proper management methods is also needed.

Shifting gears, Mills said computer technology is facing a problem of public acceptance. For the first time, he claimed, there are mounting charges that information technology can be dangerous to users' health,

CW at Cbema

and as a result there are increasing demands for government regulation.

"The question is how can new information technology be allowed to grow and contribute to the competitiveness of business and increased job satisfaction? It's a real problem, with high stakes, and in my opinion, the business equipment industry appears to be playing catch up and fighting brush fires," he said.

Mills warned his audience that new technology provides an important potential lever in labor-management relations at a time when real unemployment was on the order of 20%, not the 10% recorded by the Reagan administration.

"Activist employees or unions see new technology as an opportunity to enhance their position by responding to employee complaints. A union or employees who can hold the promise of new technology hostage can possibly gain important pay and other concessions from management," he noted.

Vendors Say Market Support Vital to Success

By Robert Batt
CW West Coast Bureau

PHOENIX — The ability of vendors to demonstrate marketing support and close ties with their users will be the key to success in an increasingly competitive market.

This was the theme that emerged in informal discussions with three members of the Computer and Business Equipment Manufacturers Association (Cbema) at its annual spring meeting here recently.

"Our company needs to focus more on the marketing aspect of our business. It is imperative that we open up new channels of distribution, and the challenge we face is to get our products to customers in the most expeditious and cost-effective way," noted Albert Mullin, vice-president of corporate relations at Digital Equipment Corp.

According to Al Oliverio, senior vice-president of marketing at Hewlett-Packard Co., it is important to focus on the systems aspects of product offerings and get more involved in application support.

"Users do not want partial solutions. There is a great demand for interface and productivity tools and so a common theme of our marketing effort is the sharing of data resources," he said.

Oliverio said the way to get results is through an information productivty network in which functions are linked and users are able to utilize common data bases and shared networks.

"Our philosophy is that systems belong to users. The whole area of network communications and distributed data processing is one that is rapidly coming upon us, and we have more work to do in that area."

The role of DDP was also stressed by William Conlin, senior vice-president at Burroughs Corp., who maintained that a continued emphasis on integrated systems solutions was the way for his company to maintain its market penetration.

"The tendency of the mainframe industry is to go more and more toward DDP, so we want to position ourselves to provide customers with both big mainframe products and DDP solutions," said Conlin.

All three company officials agreed they must respond to increased competition in the marketplace but denied their respective recent company reorganizations were dictated by IBM's market aggressiveness.

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Closer User Ties Called 'Challenge'

Marketing Support Projected as Key to Success

By Robert Batt
CW West Coast Bureau

PHOENIX — The ability of vendors to demonstrate their marketing support and close business ties with users will be the key to success in an increasingly competitive market.

This theme emerged from interviews with three members of the Computer and Business Equipment Manufacturers Association (Cbema) at the recent spring meeting here.

CW at Cbema

"Our company needs to focus more on the marketing aspect of our business," noted Albert Mullin, vice-president of corporate relations at Digital Equipment Corp. "It is imperative we open up new channels of distribution, and the challenge we face is to get our products to customers in the most expeditious and cost-effective way."

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Data Resource Sharing

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All three company officials agreed they must respond to increased competition in the marketplace, but denied their respective company reorganizations were dictated by IBM's market aggressiveness.

"IBM competition puts more pressure on pricing and product differentiation. The challenge is to recognize there is more benefit to be reaped in providing for product differentiation than in trying to fight IBM on the basis of price," the senior vice-president maintained.

According to Oliverio, HP's recent spate of organizational changes was prompted by a need to gain more centralized orchestration over company activities while still fostering an entrepreneurial spirit in company divisions.

"It is not good for the direction of the company if you are always looking over your shoulder to see what the other guy is doing," he added.

The vendors also agreed that while there is evidence of economic recovery from the recession, it has yet to impact the capital goods markets, where much of their business originates. Instead they are placing much of their faith for healthy order backlogs in the first half of 1983 in new product offerings.

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Knowledge, Not Information, Seen Key in '80s

CW at Cbema

By Robert Batt
CW West Coast Bureau

PHOENIX, Ariz. — Knowledge, not information, is the key to meeting the productivity challenges of the 1980s, according to Robert Schmidt, head of corporate marketing at Control Data Corp.

In remarks made at the Computer and Business Equipment Manufacturers Association (Cbema) spring meeting here recently, Schmidt claimed the so-called information age will be short lived.

"We are heading very quickly into the age of knowledge. Our plan, our strategy, should be the catalyst of that move. The drive toward knowledge is the one thing that will keep our companies in front of the wave of change," he asserted.

Information is meaningless unless it provides managers with the knowledge they need to improve their operations, he said. "There are more than a million computers employed in American business, and that $70 billion investment is capable of producing more than 200 billion pages of information each and every day. And where is it all getting us?" he asked.

American business is inundated with information about itself, its products and its economic environment, he said. But failure to extract knowledge and accomplish objectives from that information is causing a productivity stagnation that threatens the ability of U.S. industry to compete, he warned.

"The challenge of the 1980s is to bring coherence to the disarray caused by change, to halt the disintegration and to address head-on the enormous productivity problems of our society. The key is knowledge. By converting information into knowledge we gain the ability to address significant business opportunities."

Cbema, Schmidt said, is at a crossroads where it must address an increasingly diverse set of issues at an increasing pace. From international trade issues to the use of CRTs, the association faces issues requiring different strategies and techniques than were required in the past.

"People are the key. Now, while most organizations routinely proclaim that people are their most valuable asset, what some fail to realize is that people do not always fit into the roles they are supposed to play. Most organizations do not create the work processes and programs required to make the necessary accommodations," he concluded.

Stanford Hosting Drive to Design Next VLSI Phase

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif — A drive to orchestrate a multidisciplinary approach to designing the next generation of very large-scale integrated (VLSI) circuits is under way at Stanford University.

The three-year-old Center for Integrated Systems (CIS) has obtained $40 million in corporate and government funds to forge an ever-closer relationship between the university and the public and private sectors.

Nineteen of the country's largest computer corporations are each contributing $750,000 to build a new facility for fabricating VLSI systems. Sponsors include IBM, Hewlett-Packard Co., ITT Corp., Honeywell, Inc., Digital Equipment Corp. and Texas Instruments, Inc. The facility is due to be completed within the next 18 months and, according to John Young, HP chief executive, is an example of the way industry and universities need to cooperate for the common good.

A portion of the proceeds raised will be used to educate 30 Ph.D. and 100 masters degree candidates per year in each of the next few years.

According to John Linvill, co-director of CIS, the three disciplines of the electronics age —.computer science, information science and physical science — need to be merged if an effective response to Japanese competition in semiconductors is to be mounted.

"CIS will bring together people who, working together, will be able to produce systems they could not have conceived alone. It is clear that industry has to attack problems at a more fundamental level than it has in the past and universities will need to be more concerned with the usefulness to industry of what they are doing," he asserted.

The new 10,500 sq-ft VLSI facility is intended to house both a research lab and an assembly line that will produce VLSI chips with a short turnaround time, while serving as a test bed for processes and devices.

Commenting in a recent CIS newsletter, Lester Hogan, director at Fairchild Camera and Instrument Corp., remarked: "Now, ever-increasing chip complexity has made the design problem tremendously costly and time consuming. We simply don't know how to handle it."

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Computer Exchange Bypasses Middle Man

By Katherine Hafner
CW Staff

MINNEAPOLIS — Ronald L. Haberkorn is well acquainted with the business of buying and selling computer equipment. In 17 years with Control Data Corp. as an administrator and marketing representative, Haberkorn said he witnessed the trials and tribulations of people seeking to buy and sell used equipment.

Three years ago Haberkorn left CDC to form a dealership with a slightly unorthodox slant to it. The North American Computer Exchange began in November 1980 as an organization whose members pay annual dues to bypass the middle man and sell and buy used computer equipment among themselves.

Haberkorn will help as much or as little in the negotiating of price and coordination of a sale as a member wishes.

Membership Growing

Today the exchange is 104 members strong — 15 of them from Fortune 500 companies — and growing every day, he said.

The organization's main attraction is the absence of expensive commissions, which are an unavoidable aspect of almost any other dealer or leasing company, he noted. Annual dues for the exchange range from $900 to $10,000, depending on the size of the member's computer system. According to Haberkorn, one sizable transaction can more than pay for the membership fee.

"We exchange everything from obsolete equipment to the latest equipment," Haberkorn said. "Our basic target is IBM mainframe users, but people who have IBM equipment also have other brands."

Haberkorn sees the exchange as an alternative and complement to other companies. Many of the group's members, he said, also acquire equipment through other dealers.

John Peterson, director of DP for Northwestern National Life Insurance Co. in Minneapolis, is one of the exchange's original members. Though he does not do all his business through the group, he has made four "substantial" transactions through it.

"It's a tremendous organization," Peterson commented. "We're not only buying and selling equipment cheaper, we have a membership meeting twice a year, where there is a great exchange of ideas and problems."

Membership meetings, Peterson said, are similar to those of a users group. "The meetings make for developing good friendships. The sessions are very open and honest. No one is trying to sell anything," he said.

Jack Weinmann, manager of computer operations at Northern States Power Co. in Minneapolis, said he has netted some $20,000 since joining the group by selling old equipment he might otherwise have been forced to scrap.

"I think there should be more groups like this," Weinmann said. "It gets you down to dealing with the user. You really eliminate the middle man and save a lot of money. As it grows, it's even more helpful."

Haberkorn concedes this is no way to get rich quick, which might account for the fact that no other such group appears to exist.

"It's also very hard work," he noted. "It means going from member No. 5 to member No. 6 to member No. 7 and so on.

"Frankly, the confirmation and enthusiasm of our members has just spurred us on with an enthusiasm and commitment that won't quit," Haberkorn said.

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Marry Product, Marketing Plans for '80s: Exec

CW at ICP

By Robert Batt
CW West Coast Bureau

SCOTTSDALE, Ariz. — The successful software companies of the 1980s will be those that carefully and precisely marry their product and marketing strategies.

Speaking at the 12th annual ICP Executives Conference here recently, Harris Herman, president of Software Module Marketing, Inc., claimed documentation, packaging and support are the fundamental keys to volume sales.

He told his audience of independent software vendors that mainframe users are not receiving the support and commitment they deserve from mainframe manufacturers. "If these trends continue, it will force the end user to seek shelter with a few large vendors who do have it together. In the large mainframe arena, product commitment and support are the keys," he said.

Stating why he believes certain good software products fail in the marketplace, Herman stressed the need for an effective sales force and urged his audience to spend the time and money on fielding the best sales force possible. "An untrained staff, not conversant in your product, will be eaten up by the competition," he warned.

He also praised the establishment of user groups, seminars and workshops as a way of preserving market share. "These areas are expensive and time consuming but, as an example, active user group meetings give your customer comfort in numbers, as well as providing you with a solid reference base and, if orchestrated properly, the best unpaid sales staff you could find," he remarked.

Also speaking on the subject of why good software products fail, David Troy, vice-president of planning at Computer Associates, Inc., said a significant number of software products have failed because results of market research were misinterpreted.

"The user needs to be ready for the product. The key is to find the hot buttons," he said.

The development of a good product, he added, must recognize the need for future enhancements and maintenance support. "Good service generates good business. Bad service can destroy good products," he concluded.

Micros Seen Holding Key To DPer Lack

By Robert Batt
CW West Coast Bureau

SCOTTSDALE, Ariz.— Microcomputers hold the key to overcoming DP personnel shortages, William Nisen, director of technical support at Cullinet Software, Inc., said at the ICP annual awards meeting held here recently.

"We face a critical manpower shortage," Nisen said, repeating the familiar lament of a shortage of skilled DPers, particularly programmers, now and in the future. "What we need is to make microcomputers easy enough to use so that end users can actually control their own destiny."

Nisen said that a key strategy in meeting manpower needs is to be found in the development of artificial intelligence (AI) devices. "This area will need to explode if we are to meet the needs of data processing professionals in the 1990s," he said.

With some of the larger companies addressing the link between AI and robotics, there is a potential for industrywide growth, he said.

"The ones who do this work first and do it well will earn a tremendous amount of money," Nisen added.

Frances Smith Abernathy, president of Abernathy Business Consultants, Inc., argued that the manpower problem is even worse than it first appears. There is a two-to-five year backlog in large systems applications in most large companies, she estimated. The large system sector is growing at 40% a year, three-quarters of which is in new applications.

"Given these figures, the recruitment of systems analysts is going to be a big problem, especially since only about 2% of them know what they are really doing," she said. "The people who are going to be the first to solve this problem will be those who come up with technological solutions."

The application backlog can best be solved through an emphasis on the development of information centers, application generators and networks, Abernathy said.

On the other hand, support for the information center through the provision of productivity tools is a huge opportunity for the software industry, she added.



Executive Corner

● **Hugo Kranz Jr.** has been named president of UDC International.

● **Claudia A. Heyman** has been named vice-president of marketing services at Boole & Babbage, Inc.

● **James B. Aldrich** has been appointed vice-president, product strategy and marketing support, for the computer systems operations of Sperry Corp.

● **Adriann C. deGraaf** has been appointed vice-president of Applied Data Research, Inc. He is managing director of ADR Europe.

● **John H. Innes** has been named executive vice-president of Multitronics.

● **Lin Wu** has been appointed senior vice-president of computer development and manufacturing operations for STC Computer Systems Corp., a subsidiary of Storage Technology Corp.

● **Daniel F. Akerson** has been appointed vice-president, engineering; **Ronald J. Dranchak**, vice-president, human resources; and **Charles D. Park**, vice-president, finance, at MCI Communications Corp.

● **Robert V. Dickinson** has joined Zilog, Inc. as vice-president and general manager, General Systems Division.

● **Richard P. Rifenburgh** has been elected chairman of the board and chief executive and **Aaron H. Coleman**, president and chief operating officer, at Three Rivers Computer Corp.

● **Tom Long**, former vice-president and general manager of Textronix, Inc.'s communications division, has joined Analogic Corp. as executive vice-president.

● **Roger Mollon** has been promoted to vice-president, technology, at Graftek Technology Corp.

● **William T. Clifford** has been appointed vice-president, Software Products Division, at Applied Data Research, Inc.

● **Jim Tempas** has been appointed vice-president, software products, for the computer systems operations of Sperry Corp.

● **Carl G. Wolf**, president of Chase Econometrics/Interactive Data Corp., has been named senior vice-president of Chase Manhattan Bank.

● **David S. Dury** has been named vice-president and chief financial officer for Priam Corp.

● The following have been elected vice-presidents at Management Science America, Inc.: **Daniel R. Schmidt, James Patrick Tinley, William David Christian, Edwin D. Goodnight** and **Richard W. Page. Larry L. Smart** has been elected an MSA senior vice-president and **Julian R. Puckett** has been elected a vice-president of Peachtree Software, Inc., a wholly owned subsidiary of MSA.

● **John M. Purtell Jr.** has been appointed president and chief operating officer of On Line Microcenters, Inc.

● **Jeffrey L. Zickler** has been appointed president of MAI Applications Software Corp.

● **Peter Anderson** has been named president and chief executive officer of Ztel, Inc.

● **Leland Strange** has been appointed president and chief operating officer of Intelligent Systems Corp.

● **John P. Bourg** has been named president of Wabash Datatech, Inc., a division of Kearney-National, Inc.

● **Rex M. Fleet** has been named vice-president, financial systems division, of NCR Corp.'s U.S. Data Processing Group.

● **Howard C. Miller** has been elected chief executive officer and **John E. Cochran**, vice-president of marketing, for Boscom.

● **John C. Butler** has been appointed vice-president and general manager of the Joint Ventures/Japan organization and **Thomas S. McCaffrey** has been appointed vice-president, marketing, Americas Division, for the computer systems operations of Sperry Corp.

● **Donald E. Kimberlin** has been appointed director, international communications product marketing, for Paradyne Corp.

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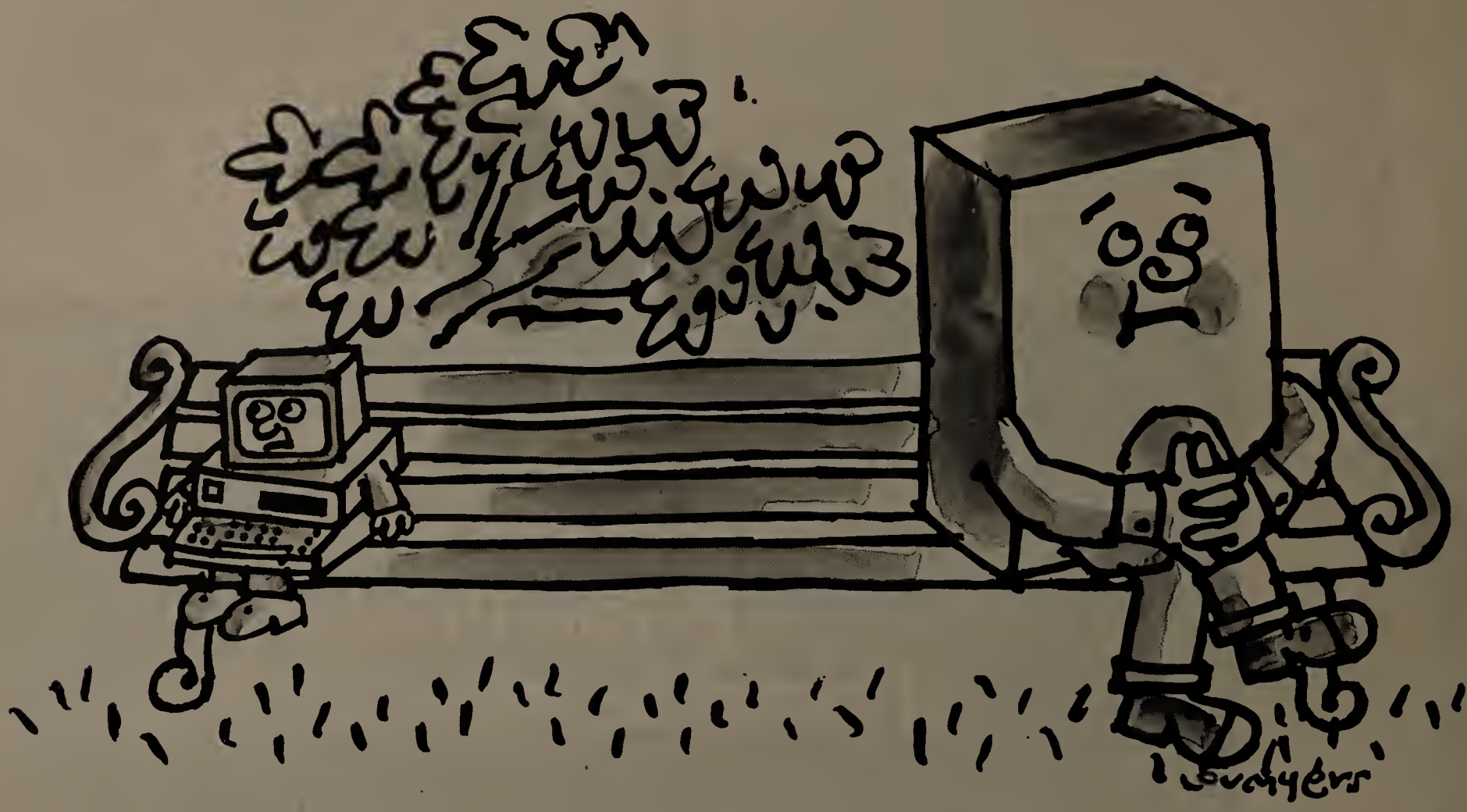
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Nickels & Dimes

Scientific Systems Services, Inc. has filed a registration statement with the Securities and Exchange Commission covering an initial public offering of one million shares of common stock, with 690,000 offered by the company and 310,000 offered by certain shareholders.

$ $ $

Tymshare, Inc. has reported that while revenues for fiscal year 1982 were $297,025,000 — a 3% increase over fiscal year 1981's $289,687,000 — net income dropped for the same period. Net income for 1982 was $8,809,000 or 73 cents per share, compared with $15,670,000 or $1.33 per share for 1981.

$ $ $

Management Science America, Inc. plans to file a registration statement with the Securities and Exchange Commission for a proposed public offering of approximately three million common shares.

$ $ $

Management Assistance, Inc. (MAI) has exercised its option acquired in May 1982 and has repurchased 1,288,200 shares of MAI common stock owned by **Continental Telecom, Inc.**

$ $ $

Software AG Systems Group, Inc. reported an 18% increase in revenues for the third fiscal quarter ended Feb. 18, compared with the same period last year.

$ $ $

Tandy Corp. has announced that sales for March 1983 were $207,417,000, a 20% increase over March 1982 sales.

$ $ $

Plantronics, Inc. has reported sales of $32,174,000 for the third quarter of fiscal 1983, an increase of 8% over the same period in 1982.

$ $ $

Wyle Laboratories, Inc. has recorded net sales for the year ended Jan. 31 of $207,683,000, down from $222,812,000 for the same period last year. Net loss for fiscal 1983 was $3,179,000.

$ $ $

Data Terminal Systems, Inc. has reported a net loss of $22.3 million or $3.81 per share for the fiscal year ended Jan. 31, compared with a loss of $10.7 million or $1.89 per share for fiscal 1982.

Orders & Installations

Philips Information Systems, Inc., Dallas, has been awarded a $10 million contract by the U.S. General Accounting Office (GAO) to supply word processing systems and related equipment and services to GAO headquarters in Washington, D.C., and 21 GAO regional offices.

Logicon, Inc. has received a $3.2 million contract extension from the U.S. Navy Supply Center for the continuation of technical services and systems analysis. Logicon received the initial $2.4 million contract from the Navy a year ago.

Revlon Inc.'s Technical Data Systems Division has been awarded a $11.4 million U.S. Government contract to install the firm's hospital information system in the William Beaumont Army Medical Center in El Paso, Texas.

Modular Computer Systems, Inc. has completed installation of a $2 million computer system for the Virginia Electric and Power Co.'s Bath County pumped-storage project.

Woods Petroleum, Phoenix, has ordered Honeywell, Inc.'s DPS 8/50 dual-processor, large-scale computer system valued at approximately $980,000.

Honeywell, Inc. has received an order from the Cotton States Insurance Co. of Atlanta for two DPS 6/74 computer systems and an upgrade of its DPS 8/44 system. The order is valued at approximately $1 million.

Northern Telecom, Inc. has been awarded a $2.5 million contract by Contel Network, Inc., a subsidiary of Continental Telecom, Inc., to supply and install an SL-10 packet-switching system.

Sperry Corp. has been awarded a contract valued at $14.5 million by the U.S. Air Force Computer Acquisition Center for hardware, software and contractor support services.

Cray Research, Inc. has received an order valued at $7.3 million from Phillips Petroleum Co. for a Cray-1/M computer system.

Intecom, Inc. has been awarded a $6.2 million contract by The Coca-Cola Co. for an IBX S/80 communications switch to be installed in Coca-Cola's world headquarters in Atlanta.

Honeywell, Inc. has been awarded a $1.6 million contract by the National Aeronautics and Space Administration for a DPS 8/52 large-scale computer system to be installed at the Kennedy Space Center.



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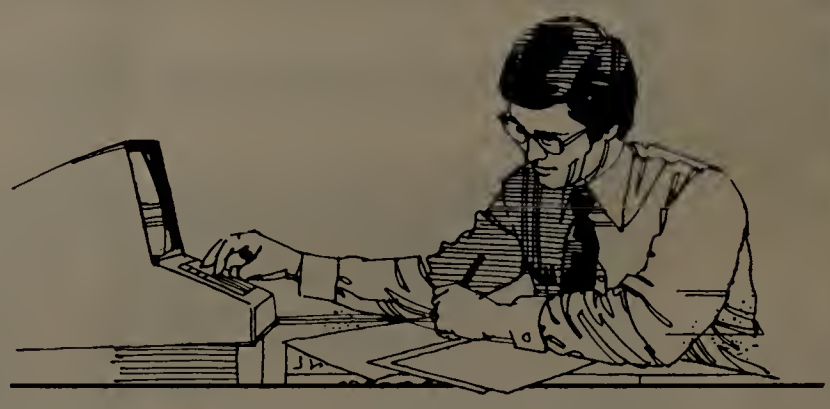
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Probationary, tenure-track position anticipated for Assistant, Associate, or Full Professor of Business Administration: Management Information Systems to begin September, 1983. The 1982-83 salary ranges are: Assistant Professor - $17,171 to $26,184; Associate Professor - $20,714 to $31,587; Professor - $23,841 to $36,356. **Reponsibilities:** Teaching undergraduate courses in the management information systems - computer area. This position will also require the person to work with other faculty members and students in curriculum development, student placement, student advising, professional service and scholarly activities. **Qualifications:** Ph.D. or DBA degree in Management Information Systems or related area and appropriate work or teaching experience. Training or experience necessary to teach courses in Data Base Management, Applied Software Development and Systems Analysis for Management. **Submit letter of application,** resume, transcripts from each institution attended and three current letters of reference by May 2, 1983 (or until position is filled) to Dr. Charles D. Foust, Dean of Professional and Applied Studies, Bemidji State University, Bemidji, MN 56601. Equal Opportunity/Affirmative Action Employer.

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Data Processing

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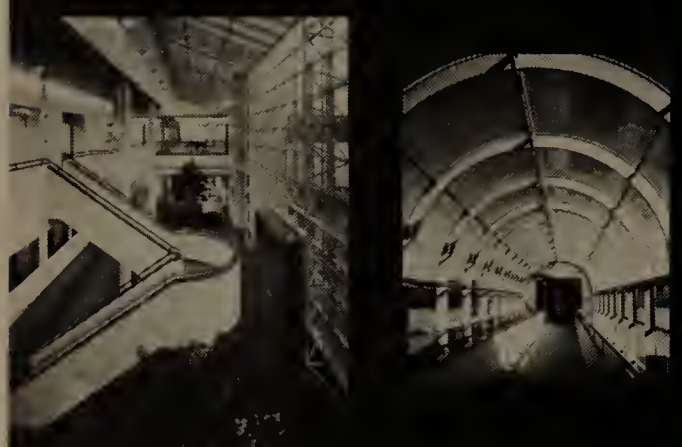
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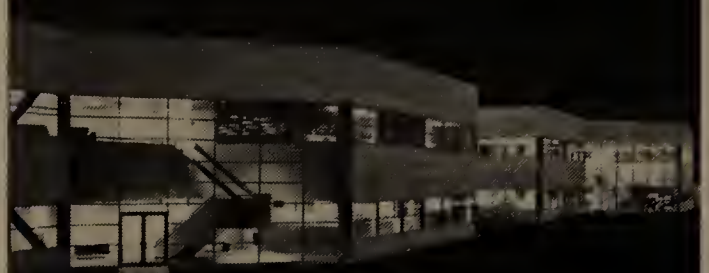


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For immediate consideration, call collect those listed above or send resume to: Ed Smith, Hughes Aircraft Company, Radar Systems Group, Dept. WC-4D, Building R4/135, P.O. Box 92426, Los Angeles, CA 90009.

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RSX--Requires at least 2 years RSX-11M applications and/or system experience.

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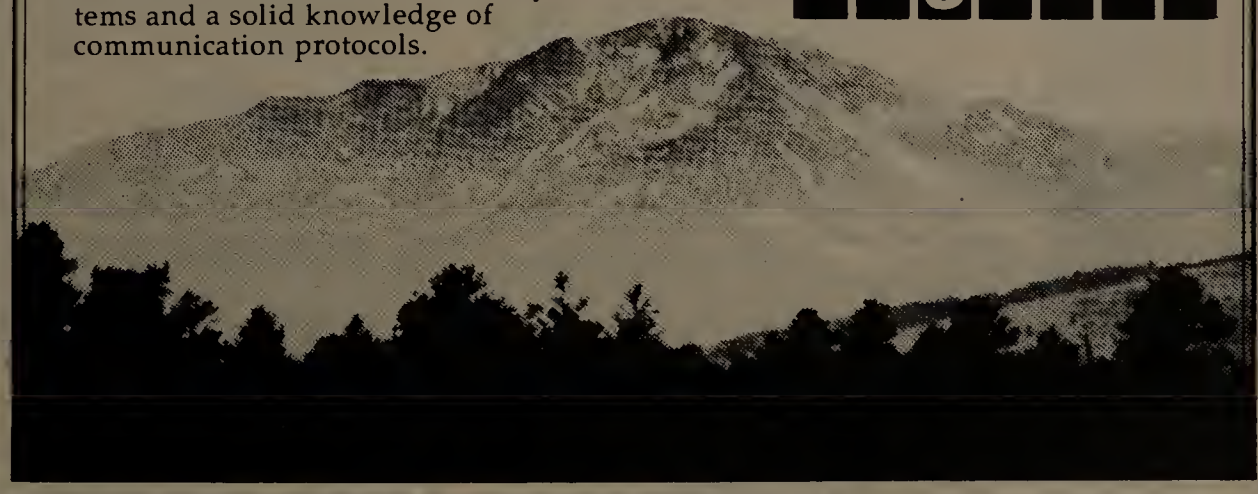
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Responsible for the management of the computer center which supports academic, administrative and research sectors of the University. The Director manages the overall activities of the computer center which encompass operations, systems development and implementation, software development and implementation, data preperation and presentation, budget and personnel responsibility. Master's Degree plus computer center experience and demonstrated leadership ability required. Experience in a college or university desirable. Low to mid 30's. Submit a resume and the names of 3 references. Selection committee will begin screening applications May 16, 1983, and continue until the position is filled. Sumbit to:

Computer Center Director
Search Committee
228 Hall Moody Administration Building
The University of Tennessee at Martin
Martin, TN 38238

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On-campus computer facilities for academic use include an IBM 4341 and 2 PDP-11/70's with RJE links to the IBM. In addition, the departmental computing lab includes terminals, micro computer, three mini-computers (PDP-11's), and assorted other peripherals. A VAX 11/780 is planned for Fall, 1983. Courses currently offered include data structures, architecture, artificial intelligence, programming languages, simulations, graphics, database, operating systems, compiler construction, software systems, data processing, and other service courses.

Screening will begin upon receipt of application and will continue until all position are filled. Employment begins September 6, 1983.

Send a resume, transcripts, and three letters of reference with the letter of application to: **Dr. Charles G. Petersen, Chairman, Computer Science Department, University of Wisconsin-Oshkosh, Oshkosh, WI 54901.**

DIRECTOR OF ACADEMIC COMPUTING WESTERN NEW ENGLAND COLLEGE

The Director of Academic Computing is expected to provide leadership and consultant support for the academic community in the areas of computing, software development, software implementation, documentation, and faculty and student computer education. The Director reports to the Academic Vice President, works closely with the Director of the Computer Center, and supervises the academic computing support staff and student assistants. WNEC is a private, coeducational college, without church affiliation, with schools of Arts and Sciences, Business, Engineering, Law, and Continuing Higher Education offering both undergraduate and graduate degrees. Majors in computer science, computer information systems, and computer engineering are available. Academic needs are served by a Data General MV8000 computer and several micro computers. Candidates with masters degrees in a related discipline are preferred. Expected also are at least five years experience in positions including both software development and management, part of which should have been in an academic environment. Essential are the interpersonal skills for working and communicating with individuals from a variety of disciplines. Salary and fringes are competitive.

Applications must be received by May 18 and should include a letter of application, official transcripts and three letters of reference. Applications sent to: Dr. Allan Bosch, Academic Vice President, Western New England College, 1215 Wilbraham Road, Springfield, MA 01119.

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Qualifications should include recent industrial experience M.S. in Engineering (related to systems), and P.E. License. Applicants with B.S. in Engineering or Technology will be considered if they have extensive industrial experience. Responsibilities include teaching, curriculum development, professional development and service on faculty committees.

Position available September 1, 1983. Send resumes before May 15, 1983 to: George A. Mostoller, Director of Engineering Technology, University of Pittsburgh at Johnstown, Johnstown, PA 15904. UPJ is a four-year regional campus and an equal opportunity/affirmative action employer.

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You're responsibilities would include:
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We provide an outstanding company paid benefits package, good starting salary commensurate with your experience, and the professional growth and recognition you deserve. Deadline for receiving resume is May 6, 1983. For immdiate consideration send your resume in confidence to:

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Salary for 9-month contract is negotiable - competitive with regional college/industry standards. Fringe benefits are liberal.

By **6 May 1983** send application letter, current resume, and placement file to David Alley, DP Search Chairperson, Arkansas College, 2300 Highland Drive, Batesville, AR 72501.

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St. Vincent College, a small (1000 students) liberal arts college in Latrobe, Pennsylvania, invites applicants for this position to begin July 1, 1983. The Director is responsible for the development and operation of the computer center, and the related activities of Institutional research and word processing services. The Director will be responsible for the installation of a new computer system to replace the current system. To qualify for the position a candidate should have at least a Master's Degree in computer information systems or a related field and have at least 3 years successful experience in management. The salary is competitive. A resume, transcripts, and 3 letters of recommendation should be sent to **The Personnel Director, St. Vincent College, Latrobe, PA 15650 by May 11, 1983. EOAAE.**

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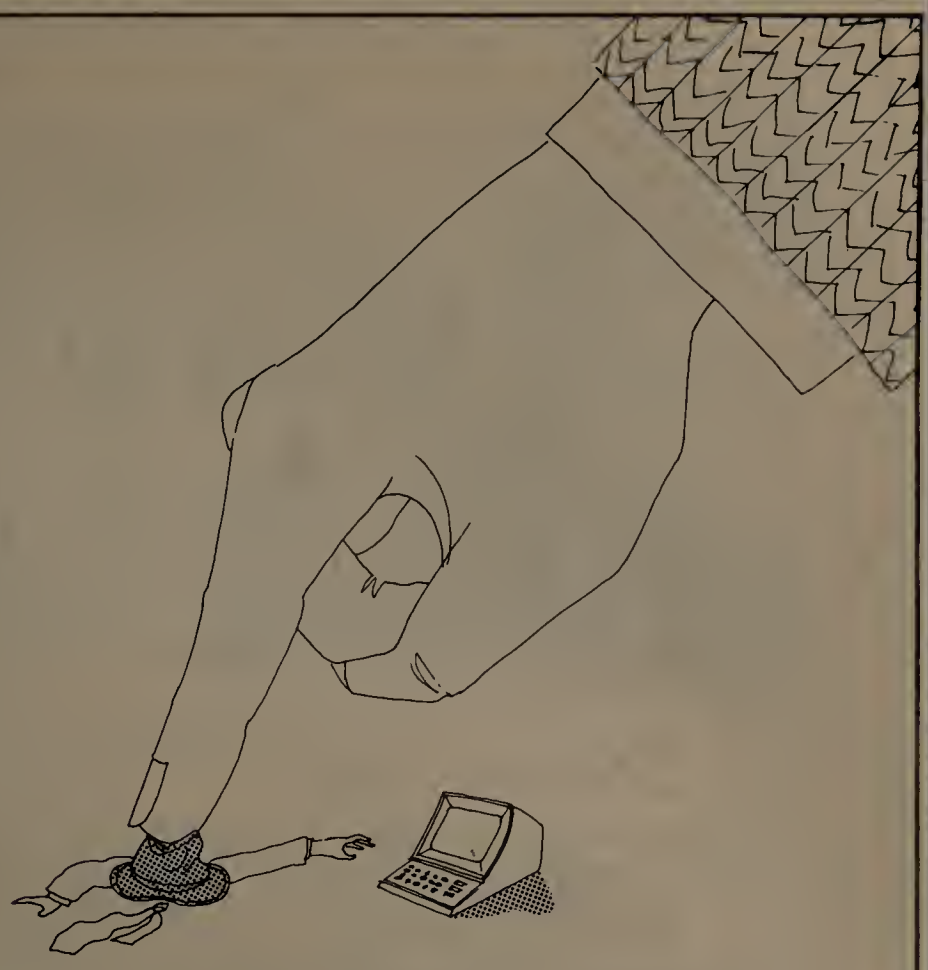
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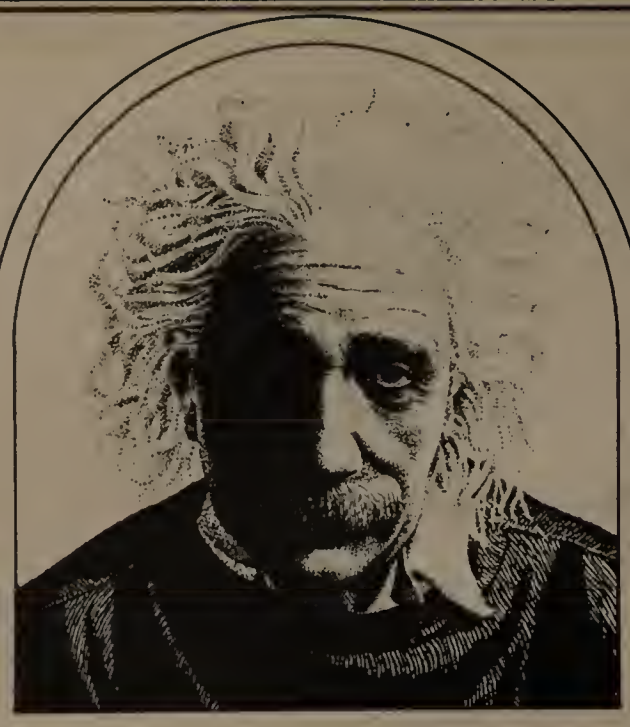
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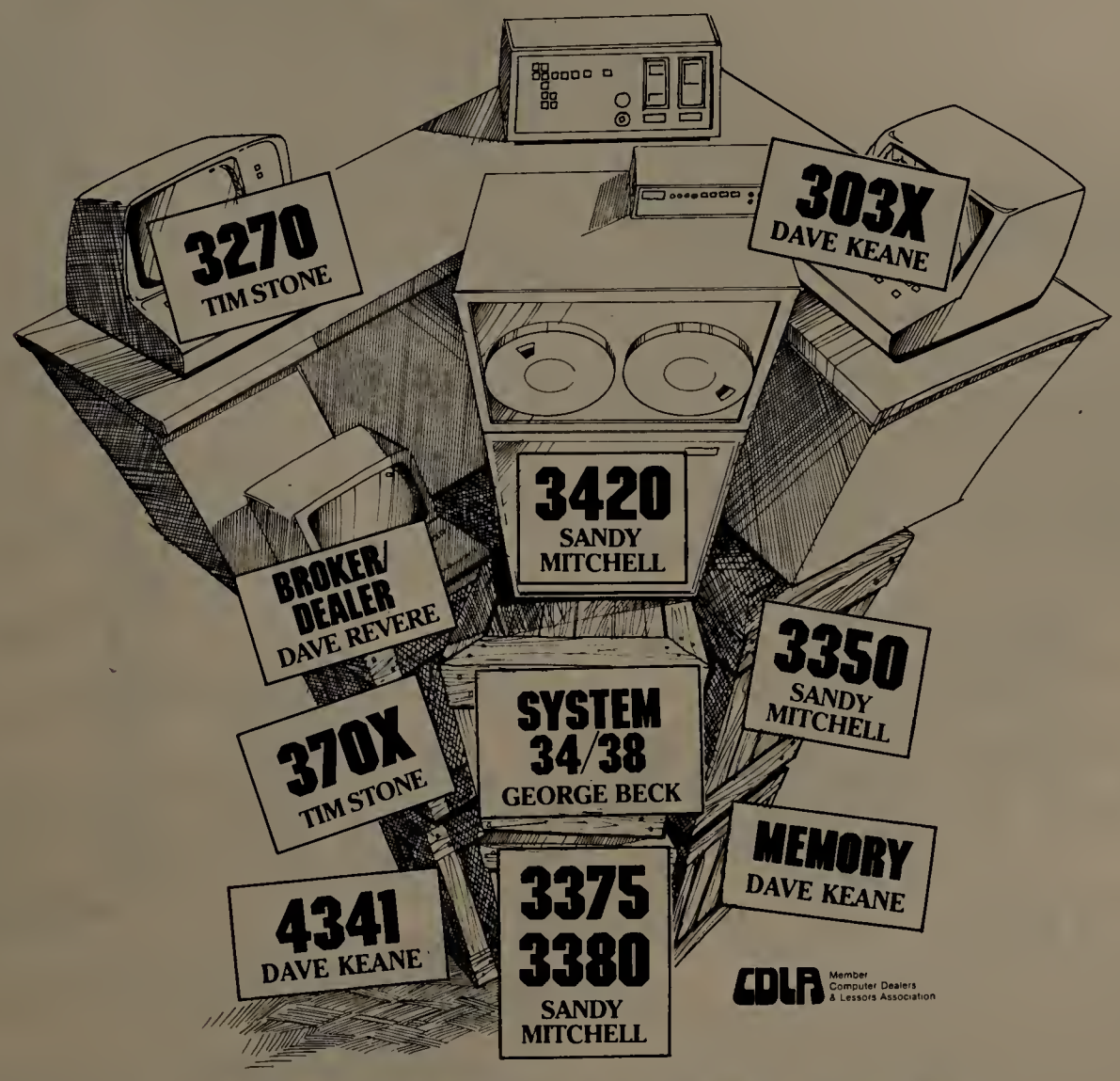
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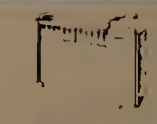
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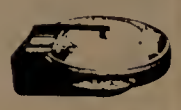
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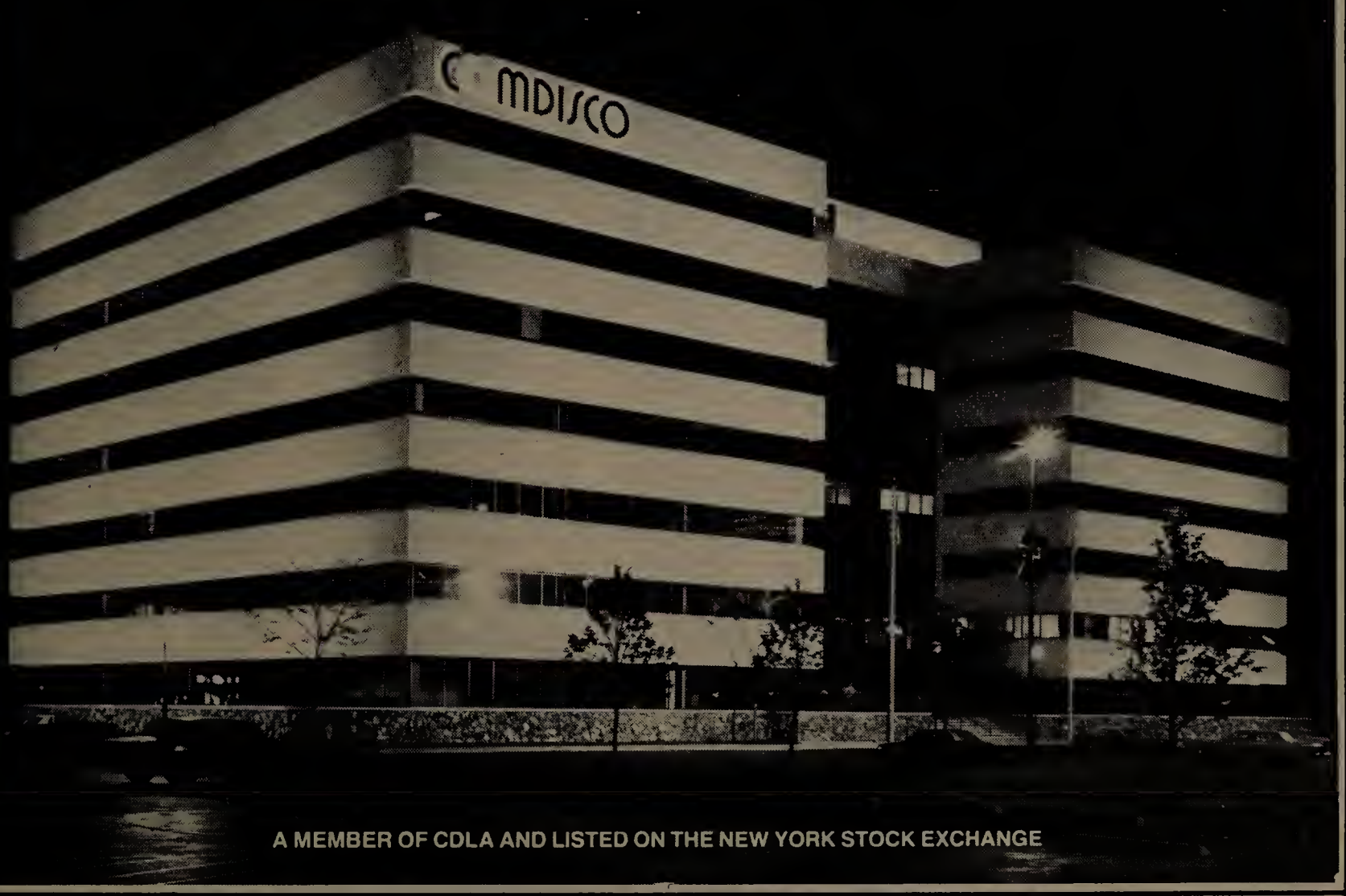
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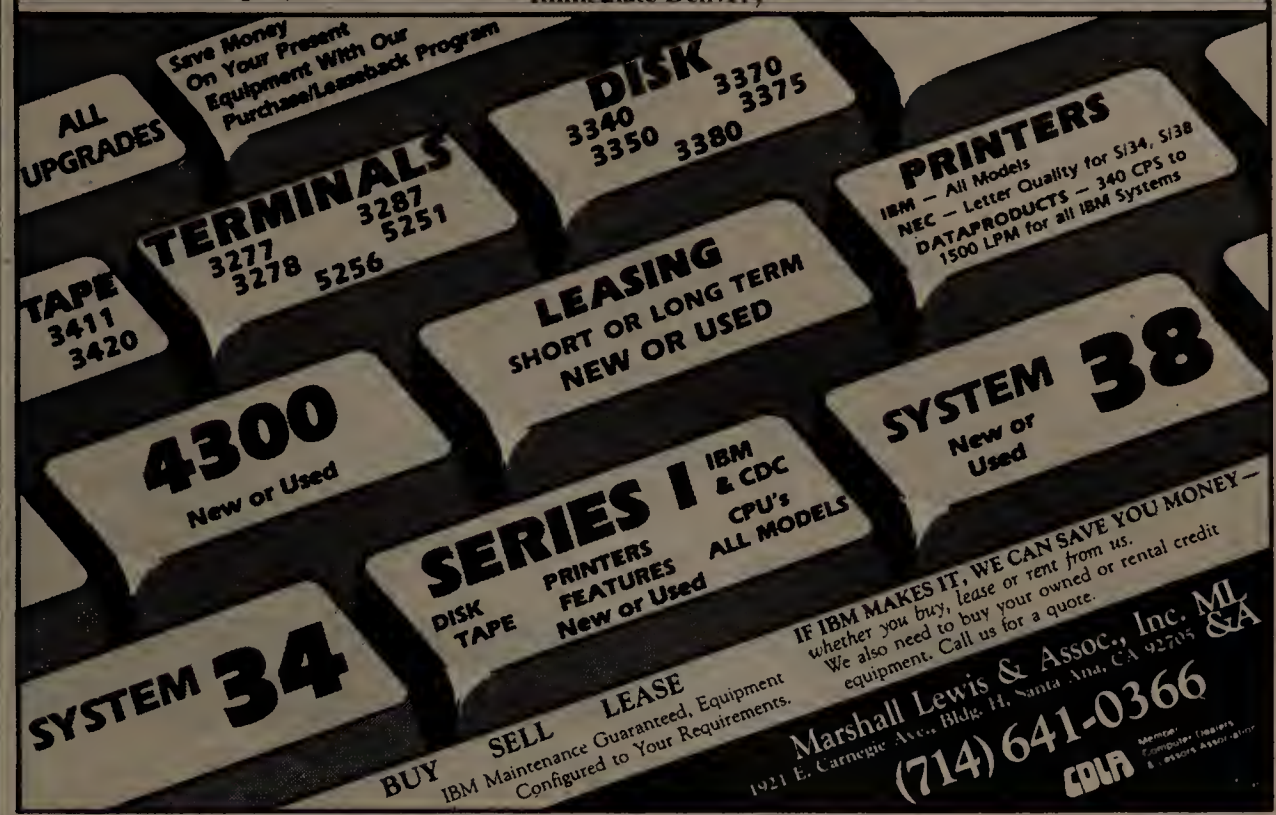
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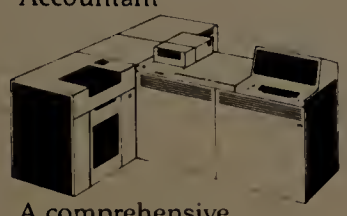
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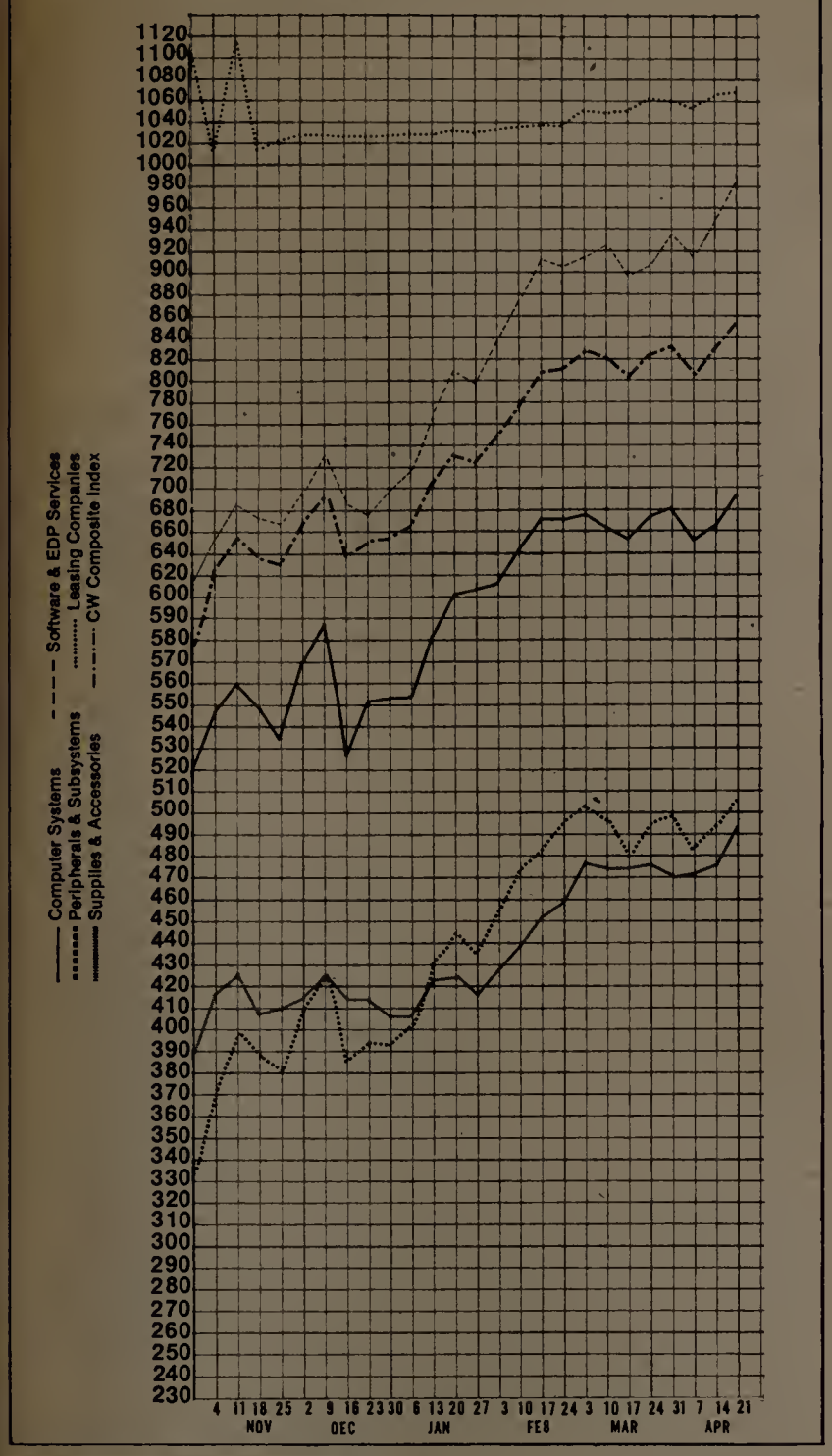
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Computerworld Stock Trading Summary

TRADE*QUOTES

CLOSING PRICES WEDNESDAY, APRIL 20, 1983

All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge, Mass. 02139

EXCH		1982-83 RANGE (1)	CLOSE APR 20 1983	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	17- 44	41	+2 3/4	+7.1
N	BURROUGHS CORP	28- 49	45 5/8	+ 1/4	+0.5
O	COMPUTER AUTOMATION	7- 17	11 1/2	- 1/4	-2.1
A	COMPUTER CONSOLES	15- 44	38 3/8	+4 3/8	+12.8
N	CONTROL DATA CORP	21- 52	50 3/8	+2 7/8	+6.0
N	CRAY RESEARCH INC	20- 49	39 3/8	-2 3/8	-5.6
N	DATA GENERAL CORP	20- 66	65 5/8	+4	+6.4
N	DATAPOINT CORP	11- 36	20 3/4	+ 1/8	+0.6
N	DIGITAL EQUIPMENT	62-132	125 3/8	+2 3/8	+1.9
A	EECO INC	6- 13	13	+1 3/4	+15.5
N	ELECTRONIC ASSOC.	5- 12	8 7/8	- 1/8	-1.3
N	FLOATING POINT SYST	16- 38	34 3/8	+2 3/4	+8.6
N	FOXBORO	22- 43	38 1/4	+1 3/8	+3.7
O	FULCRUM COMP GRP	1- 3	1/4	0	0.0
O	GENERAL AUTOMATION	3- 9	9	+1 1/8	+14.2
N	HARRIS CORP	20- 51	42	-1 5/8	-3.7
N	HEWLETT-PACKARD CO	36- 87	79 1/2	- 5/8	-0.7
N	HONEYWELL INC	60-104	104	+1 1/4	+12.1
N	IBM	57-115	115 1/8	+6 3/8	+5.8
O	IPL SYSTEMS INC	5- 11	8	- 1/4	-3.0
O	MAGNUSON COMP SYSTS	2- 5	3	0	0.0
N	MANAGEMENT ASSIST	7- 18	13 7/8	- 1/2	-3.4
O	MINI-COMPUTER SYST	1- 2	1 7/8	+ 3/8	+25.0
N	MODULAR COMPUTER SYS	6- 15	13 7/8	+3 3/8	+32.1
N	MOHAWK DATA SCI	10- 19	17	+1 1/2	+9.6
N	NCR	39-118	117	+8 1/4	+7.5
N	PERKIN-ELMER	17- 33	25 3/4	-1 3/8	-5.0
N	PRIME COMPUTER INC	16- 45	31 1/4	-2	-6.0
N	SPERRY CORP	21- 39	36 1/2	+ 3/4	+2.0
O	TANDEM COMPUTERS INC	14- 34	27 5/8	- 1/4	-0.8
N	TEXAS INSTRUMENTS	71-176	160 1/4	-4 1/4	-2.5
A	WANG LABS "B"	13- 37	35 3/8	+1 1/4	+3.6
A	WANG LABS "C"	11- 37	35 3/4	+2 1/8	+6.3
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	22- 37	37	+1	+2.7
N	COMDISCO INC	7- 30	28 1/4	+2 1/4	+8.6
B	COMMERCE GROUP CORP	1- 1	1/4	0	0.0
O	COMPUTER INVSTRS GRP	1- 2	1/2	0	0.0
O	CONTINENTAL INFO SYS	5- 22	19 3/4	+2	+11.2
N	DPF INC	5- 14	12 7/8	-1 1/8	-8.0
O	ITEL	1- 3	1 1/8	0	0.0
O	LEASPAC CORP	1- 2	1/8	0	0.0
N	U.S. LEASING	18- 45	44 5/8	+ 3/4	+1.7

EXCH		1982-83 RANGE (1)	CLOSE APR 20 1983	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	5 1/2	0	0.0
O	ADVANCED SYSTEMS INC	9- 24	23	+1 3/4	+8.2
O	AGS COMPUTERS INC	7- 22	19	+ 1/2	+2.7
O	AMERICAN SOFTWARE	22- 25	21 1/2	-1 1/2	-6.5
N	ANACOMP INC	9- 23	19 3/4	-1	-4.8
O	ANALYSTS INTL CORP	5- 11	10 1/2	+ 1/4	+2.4
A	APPLIED DATA RES.	8- 29	26 7/8	-1 1/8	-4.0
O	ASK COMPUTER SYSTEMS	12- 36	35 1/4	+3 1/8	+9.7
B	ASTRODYNE COMP INC	1- 6	4 1/2	- 3/4	-14.2
N	AUTOMATIC DATA PROC	21- 40	36 1/2	+ 3/4	+2.0
O	CGA COMPUTER ASSOC	5- 14	13	+1 5/8	+14.2
O	COMPUTER ASSOC INT'L	12- 51	51	+1 3/4	+3.5
O	COMPUTER HORIZONS	2- 17	19 3/4	+1 3/4	+9.7
O	COMPUTER NETWORK	4- 10	9 1/8	0	0.0
N	COMPUTER SCIENCES	11- 23	18	- 1/4	-1.3
O	COMPUTER TASK GROUP	8- 19	18 1/2	0	0.0
O	COMPUTER USAGE	2- 22	15 1/4	-1 1/4	-7.5
O	COMPUTONE SYSTEMS	15- 38	23	+1 3/4	+8.2
O	COMSERV CORP	11- 20	12 3/4	0	0.0
O	COMSHARE	6- 13	10 1/2	- 1/4	-2.3
N	CULLINET SOFTWARE	12- 39	39 1/4	+4 1/2	+12.9
O	CYCARE SYSTEMS INC	9- 18	17 1/4	+ 1/4	+1.4
O	DATA DIMENSIONS INC	1- 2	3/4	+ 1/8	+20.0
O	DATATAB	0- 2	3/4	0	0.0
O	DYATRON CORP	2- 4	3 1/4	+ 1/8	+4.0
N	ELECTRONIC DATA SYST	19- 60	60	+2 5/8	+4.5
N	INFORMATICS INC	10- 31	29 3/4	+1 1/8	+3.9
O	INSYTE CORP	1- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1 1/8	0	0.0
O	KEANE ASSOCIATES	4- 12	10 3/4	+ 3/4	+7.5
A	LOGICON	12- 36	35 5/8	+1 1/2	+4.3
O	MNGT SCI AMER INC	8- 28	26	+5 1/4	+25.3
O	MATHEMATICA INC	12- 23	21	- 1/2	-2.3
O	MATHEMATICAL APP GRP	12- 22	19 1/2	+ 1/4	+1.2
O	NATIONAL DATA CORP	5- 24	22 3/8	+1 7/8	+9.1
O	PANSOPHIC SYSTEMS	8- 25	21 3/4	0	0.0
N	PLANNING RESEARCH	6- 17	16 7/8	+1 7/8	+12.5
O	POLICY MGMT SYSTS CP	36- 55	54 3/4	+8	+17.1
O	PROGRAMMING & SYS	1- 4	3 5/8	+ 1/8	+3.5
O	REYNOLDS & REYNOLD	17- 39	38 1/2	+4	+11.5
O	SEI CORP	11- 26	26	+2 1/2	+10.6
O	SHARED MEDICAL SYST	13- 36	36 3/8	+1 7/8	+5.4
O	SCIENTIFIC COMPUTERS	6- 13	11 3/4	0	0.0
O	SOFTWARE AG	5- 17	8 1/8	- 1/2	-5.7
N	TYMSHARE INC	12- 30	19 7/8	+ 1/2	+2.5
A	URS CORP	5- 14	13 1/2	+1	+8.0
N	WYLY CORP	7- 13	11 7/8	- 1/2	-4.0
	PERIPHERALS & SUBSYSTEMS				
P	AM INTERNATIONAL	2- 4	3 3/4	+ 1/8	+5.1
A	ANDERSON JACOBSON	9- 26	19 1/2	+ 1/4	+1.2
O	AUTO-TROL TECHNOLOGY	8- 21	14 5/8	+1 3/8	+10.3
O	BANCTEC INC	7- 33	17 1/2	+ 3/4	+4.4
A	BEEHIVE INT'L	4- 11	10	+ 1/8	+1.2
A	BOLT,BERANEK & NEW	13- 43	43 1/8	+2 3/4	+6.8
O	CAMBEX CORP	2- 4	2	+ 1/4	+14.2
N	CENTRONICS DATA COMP	6- 20	18 5/8	+ 7/8	+4.9
A	CETEC CORP	4- 10	9 3/4	0	0.0
O	COGNITRONICS	2- 14	13 3/8	+2 5/8	+24.4
O	COMPUTER COMMUN.	1- 2	1 3/4	0	0.0

EXCH		1982-83 RANGE (1)	CLOSE APR 20 1983	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER DEVICES INC	4- 21	15 5/8	+ 1/2	+3.3
O	COMPUTER TRANSCEIVER	4- 12	11 3/8	- 1/8	-1.0
N	COMPUTERVISION CORP	19- 45	37 3/4	+ 5/8	+1.6
N	CONRAC CORP	21- 36	34 7/8	+4	+12.9
A	DATA ACCESS SYSTEMS	1- 4	1 1/8	0	0.0
A	DATAPRODUCTS CORP	16- 41	24 1/8	+1 3/8	+6.0
A	DATARAM CORP	5- 12	10 1/8	- 1/8	-1.2
O	DATUM INC	2- 12	11 1/8	+1 3/4	+18.6
O	DAVID JAMISON CARLYL	2- 7	3 1/2	- 3/8	-9.6
O	DECISION DATA COMPUT	3- 14	12 1/2	- 1/2	-3.8
O	DELTA DATA SYSTEMS	1- 4	3 1/4	- 3/8	-10.3
N	ELECTRONIC M & M	5- 10	8 3/4	- 1/8	-1.4
O	EVANS & SUTHERLAND	18- 50	39 3/8	- 5/8	-1.5
O	GANDALF TECHNOLOGIES	10- 22	13 5/8	+ 1/8	+0.9
N	GEN'L DATA COMM IND	6- 19	17 3/8	+1 5/8	+10.3
O	GENERAL TERMINAL CP	0- 2	7/8	-	-6.7
O	GREAT SOUTHWEST IND	2- 6	1 1/2	- 1/4	-14.2
N	HAZELTINE CORP	22- 71	67	-3 1/2	-4.9
O	ICOT CORP	3- 10	8 1/4	+	+0.7
O	INFORMATION INTL INC	10- 22	19	- 1/4	-1.2
O	INTEL CORP	21- 49	47	- 3/4	-1.5
O	IPL SYSTEMS INC	5- 11	8	- 1/4	-3.0
A	LUNDY ELECTRONICS	7- 16	14	+ 5/8	+4.6
A	MSI DATA CORP	14- 36	17 3/4	- 3/8	-2.0
O	NETWORK SYSTEMS CORP	15- 46	44 5/8	+4 5/8	+11.5
O	OMEX	3- 5	4	0	0.0
N	PARADYNE CORP	25- 30	24 3/4	-3 7/8	-13.5
A	PENRIL CORP	7- 13	10 3/8	- 1/8	-1.1
O	RAMTEK CORP	12- 26	22 1/2	+2	+9.7
N	RECOGNITION EQUIP	4- 14	14 1/8	+2 1/8	+17.7
O	SCAN DATA	1- 3	1 3/8	0	0.0
N	STORAGE TECHNOLOGY	16- 33	19 5/8	0	0.0
O	SYKES DATATRONICS	6- 27	10 1/8	+ 1/8	+1.2
A	T BAR INC	7- 14	11 1/2	+ 5/8	+5.7
A	TAB PRODUCTS CO	8- 26	25 1/2	0	0.0
A	TEC INC	6- 12	7 7/8	- 1/8	-1.5
N	TEKTRONIX INC	34- 75	65 7/8	- 1/8	-0.1
N	TELEX	5- 27	23 1/2	+2 1/4	+10.5
O	TESDATA SYSTEMS CP	3- 11	10	+ 1/8	+1.2
N	TIMEPLEX INC	7- 24	22	+2 1/2	+12.8
O	VISUAL TECHNOLOGY	9- 23	23	+3	+15.0
O	WILTEK INC	1- 4	2 5/8	- 1/8	-4.5
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	11- 27	26 1/2	+2 1/8	+8.7
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	13- 27	25 7/8	+ 1/2	+1.9
O	CYBERMATICS INC	1- 1	1 1/4	0	0.0
A	DUPLEX PRODUCTS INC	12- 23	23 1/8	+ 1/4	+1.0
N	ENNIS BUS. FORMS	16- 34	33 3/4	+ 1/2	+1.5
N	3M COMPANY	49- 84	84 1/4	+6 7/8	+8.8
N	MOORE CORP LTD	26- 49	48 5/8	+1 5/8	+3.4
N	NASHUA CORP	9- 19	12 1/8	- 5/8	-4.9
O	STANDARD REGISTER	32- 94	94	+12	+14.6
N	WALLACE BUS FORMS	22- 56	54	+3 1/2	+6.9

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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